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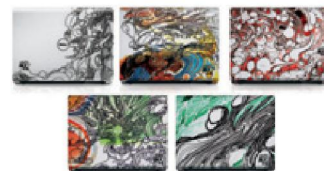
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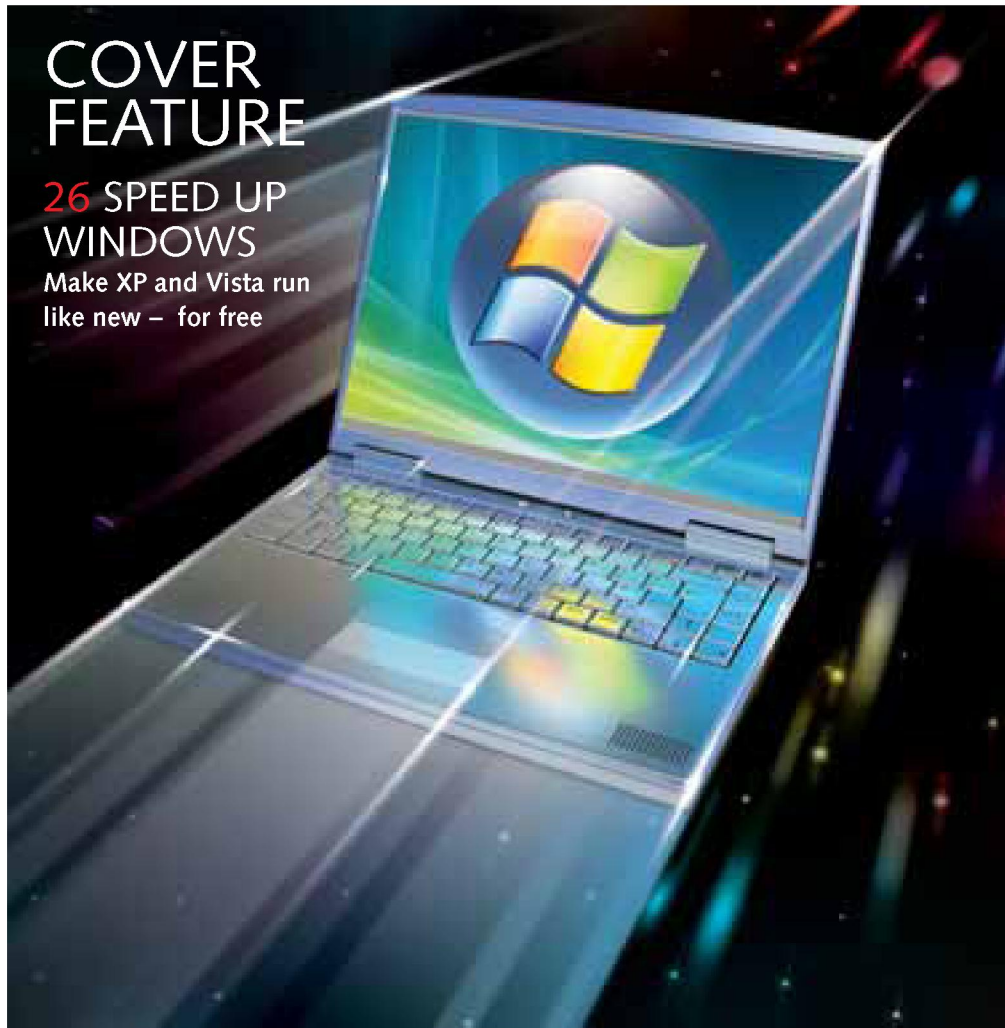
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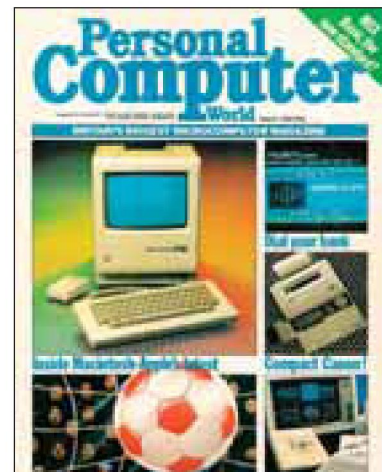
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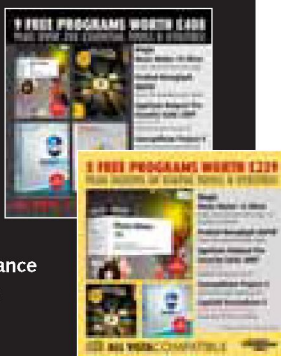
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GROUP TEST

82 NETWORK HARD DRIVES

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GROUP TEST

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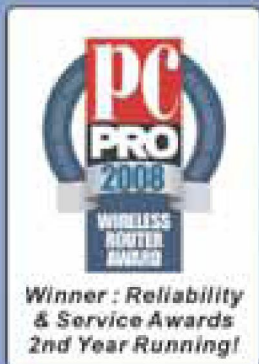
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Editorial



kelvyn.taylor@incisivemedia.com

Time to roll up your sleeves

A slow PC can often be a great opportunity to get to understand Windows better

For many PCW readers, a poorly performing PC is seen as an opportunity rather than a threat – a chance to get your hands dirty and poke around in the innards of the operating system or the hardware. But even if you're confident about hacking into the uncharted depths of Windows, sometimes you just want to get the job over and done with as soon as possible.

Usually, that's the time to dig out your favourite repair tools and let them work their magic – but if you don't have such a toolkit to hand, where do you start?

That's where this month's cover feature comes in. Starting on page 26, we aim to guide you around the minefield of system maintenance tools, giving you our recommendations for some of the best free and low-cost applications that should help you get your system back into working order fast.

'The problem is no two PCs are ever identical and sometimes the best tools can't cope'

Of course, the problem is that no two PCs are ever identical and sometimes even the best tools can't cope, or you may be able to fix one problem only to uncover (or cause!) several more. It can be incredibly frustrating – believe me, I've been there many times. Only a few days ago, after an attempted graphics driver update, my ageing Vista PC decided to ignore the update and reject a Sytem Restore. Luckily, I had a full recent backup image to fall back on, but in the end removing the offending driver by booting into Safe Mode did the trick. Another wasted day to chalk up to experience.

But the good news on the same day was that I finally got round to installing Windows 7 beta on

my secondary hard drive. Until now, I've been trying it out in a virtual PC using Virtualbox, and that doesn't support all the Direct3D interface goodies. So I brushed up on my multi-booting skills, only to find that I didn't need them: pointing Windows 7 at the spare drive during installation did everything for me. After 30 minutes or so it had installed and created a multi-boot menu so now I can choose which OS to boot. It also handily hides the Vista drive from Windows 7, so you can't cause any accidental mischief. We'll be looking at multi-booting in more detail in next month's issue.

Windows 7 is quite impressive, but there's still an awful lot to change – recently Microsoft announced 36 new and improved tweaks that will appear in the Release Candidate version.

One of my biggest frustrations with Vista is that I have no way of streaming recorded TV content to my TV, so have to watch recordings in my 'office'. I don't want to buy an Xbox 360, which is one of the easiest ways to get a Media Center Extender that will do the job I want. But as you'll see in our group test on page 82, there are now loads of network hard drives with built-in media serving capabilities on the market. One of these could be just what's needed and the prices are reasonable.

Finally, thanks to all of you who wrote in to comment on our revamped Retro section. The response has been overwhelmingly positive to date (apart from one chap who objected to paying twice for the same article), so we're continuing this month with the first review of Apple's original groundbreaking Macintosh from 1984. As you'll see, the reviewer struggled to explain how its new-fangled graphical interface worked. These days it's the other way round, when a Windows command prompt can generate more puzzlement than the Start menu. **PCW**

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Slump threatens IT transition

The economic crisis is hitting the IT industry as it goes through perhaps its most exciting transition since the advent of the web. The convergence of the phone and computer industries, evident at two trade shows in the past month, is giving rise to new portable formats that will surely evolve into the definitive computing platform of the early 21st century.

One result is that Cebit, still the world's biggest computer show (see page 11), is becoming overshadowed by Mobile World Congress (pages 14 and 15).

Mobile specialists are emerging as strong competitors for the PC industry. Nokia plans to launch a netbook (www.pcw.co.uk/2237395) and chips using the ARM architecture are challenging Intel on computing power and efficiency, promising a new class of ultra-thin portable (pages 16 and 24).

Netbooks and mobile internet devices (MIDs) are eroding the distinction between smartphones and portable computers, and their ability to deliver content will shape the future of TV, books, newspapers and magazines. At the same time a drift of advertising to the web is causing magazine and newspaper closures here and in the

US, and has forced ITV to cut back on programming and staff.

Print titles may migrate to the emerging new delivery platforms, which could also produce new revenue streams for TV and radio through, for instance, interactive adverts. But media companies could be in for a rocky time until these platforms become established and they have a long way to go technologically (though sales of relatively primitive ebook readers have been higher than expected).

How much the economic crisis will affect the rate of development is anyone's guess. In a major gesture of faith, Intel announced that it is ploughing \$7bn into new fabs. This is significant because of the hidden economic layer of Moore's Law, the prediction that transistor density (and thus computing power) will double every 18 months. It holds only if the revenue from one generation of chip can cover the huge investment required to produce the next.

Even Intel is spreading its bets. It has signed a deal with the giant Taiwan Semiconductor Manufacturing Company (TSMC) to develop new Atom processors and systems-on-a-chip targeted at ARM's core markets such as

handsets and in-car systems. These are also the target markets for four new Atom Z5xx processors due to launch this spring.

Other chip firms are looking less buoyant. AMD has had to hive off its chip manufacturing (page 17) and memory makers Spansion and Micron Technology announced layoffs due to a collapse in demand. Spansion, part owned by AMD and Fujitsu, also filed for Chapter 11 protection. (www.pcw.co.uk/2237548).

Lloyd Kaplan, chief operating officer of market analysts iSuppli, said the final quarter of last year was a "shocker" for the industry, with most businesses in survival mode and between them sitting on around \$11bn worth of excess stock. He reckoned Asustek alone was holding \$1.4bn worth of motherboards, netbooks and laptops – about four months' supply, and twice its normal stock.

Analyst Gartner predicts PC shipments will be down 11.9 per cent this year over 2008, three times worse than the previous worst drop in 2001. But that still means 257 million boxes will be sold: the IT industry may be reeling but it is far from dead. *Clive Akass*

Slide rules OK when you don't have a PC

When your reporter was a student, there were no digital computers for ordinary mortals, digital calculators did not exist, and calculating the results of a simple experiment could take hours.

We did have a kind of analogue computer, though. The slide rule was then (early 1960s) around 340 years old, and few of us had any idea that within a decade it would look as antiquated as a horse and cart.

It used two sliding logarithmic scales that allow you to multiply or divide two numbers simply to a surprising degree of accuracy (for a full explanation see Test Bed www.tinyurl.com/bmphe9).

This picture shows a 1901 Farmer's slide rule, held by Colin Barnes of the UK Slide Rule Circle, which has set up a display of 40 examples going back 250 years at the National Museum of



Photo: John Robertson

Slide rules produced accurate results

Computing, Bletchley. A 10-page booklet, *A Brief History and Types of Slide Rule*, is available for £5 from the museum site at www.tnmoc.org.

Clive Akass

Anti-virus firms defend fees

Anti-virus companies have responded to complaints that users are being pushed into paying for support to remove malware their own software has failed to get rid of.

I raised the issue with Symantec after trying to clear a virus from a friend's computer. Symantec's instructions did not work and twice when I contact its online support I was told the issue would be 'escalated' – and was then confronted with a web page giving me the option of paying or going back where I started from.

The page does not even make clear which service is paid for and which isn't (see my blog at www.tinyurl.com/bn9qys).

Barry Fox also had problems with Symantec support (see page 22). Then another friend told me McAfee had tried to charge him \$90 (£61) to clear a virus its own product had failed to remove.

Both companies say users should not need to pay in these circumstances and that they would look into the problem. Symantec is reviewing the design of its pages.

But if users are paying for security maintenance and support, what is the point of the paid-for service? And in what circumstances is one expected to pay?

Symantec said paid-for services are for customers with specific needs, for instance to cover for when there are no technical staff.

McAfee said its fee-based removal service was for non-customers or for those infected by viruses because their McAfee protection was out of date. "Customers with current and up-to-date McAfee subscriptions will not be charged for the removal of a virus, providing they have not done anything to put themselves at risk."

Customers infected with a new form of virus can use instructions provided by the software to submit their virus to McAfee Avert Labs. "McAfee will attempt to remove any infection for the customer without charge." *Clive Akass*

● Have you been charged extra for virus removal? Write to letters@pcw.co.uk.

O2 Joggler

O2 has launched a 7in touchscreen calendar designed to show at a glance what everyone in your family is doing and to send text reminders. In addition, it can show photos, play music and video content, and link to news, traffic and weather information.

Vista SP2 RC

Microsoft has made the latest Release Candidate of Vista Service Pack 2 (SP2) available for download at www.tinyurl.com/8epok5. SP2 addresses reliability and performance issues, supporting new kinds of hardware, and adding support for several emerging standards, Microsoft says.

Tally Genicom

Insolvency administrators Nigel Atkinson and Neil Mather, of Begbies Traynor, have been appointed to sort out the affairs of Tally Genicom Ltd UK, which supplies printers and services to many businesses in the UK. Fifty-five of the 73 staff at its Basingstoke headquarters were made redundant.

→ www.pcw.co.uk/2236738

Memory merge

Taiwan is merging six of its embattled DRAM memory suppliers into a single company called the Taiwan Memory Company (TMC).

→ www.pcw.co.uk/2237946

Plastic Logic shows thin ebook reader

This is the new ebook reader from Plastic Logic, a company spun off from the Cavendish Laboratory at Cambridge.

It is close to A4 size and the screen uses the same E-ink display as other readers. The difference is that the display is driven by a pliable matrix of plastic transistors. These can be printed using soluble polymers with semi-conductor properties.

The display, as with all ebook readers, draws energy only when it changes state – unlike standard LCD screens that need continuing refreshes.

→ www.plasticlogic.com



The Plastic Logic reader is only 7mm thick

Rivals tussle over data-over-mains standards

Data-over-mains systems are undergoing the kind of standards tussle that plagued the development of DVDs and HD recording.

The Homeplug specification, used in most off-the-shelf mains data adapters, is the 'baseline' of an emerging IEEE standard called P1901. The Homeplug Association is essentially a group of companies making products to its specification.

A similar consortium, the Universal Powerline Association (UPA), using a different

technology, has joined an organisation called the Homegrid Forum to develop an International Telecommunication Union (ITU) standard called G.hn for multimedia traffic over coax, household wiring and phone lines.

Homeplug is also 'contributing' to the G.hn debate and the HPA says it is working on making the two systems interoperable and able to co-exist in the same wiring.

But yet another group, the Consumer Electronics Powerline

Communication Alliance (CEPCA) is pushing a specification for use in home devices such as televisions. It includes Hitachi, Mitsubishi, Panasonic, Philips, Pioneer, Sanyo, Sony and Toshiba.

Neither the IEEE nor the P1901 committee responded to questions about the standard. Establishing standards, as the DVD saga showed, is less about choosing the best technology than about companies fighting to get their intellectual property adopted.

Online safety

The *Computeractive Ultimate Guide to Staying Safe Online* is the latest guide from our sister publication. It tells how you can protect yourself and your family from viruses, trojans, worms, spyware, adware, keyloggers and more. It's on sale now for £5.99.

Turn a deaf ear to music



The iPod generation could become the deaf generation if dire warnings about hearing damage from ear pods turn out to be justified. But technology from Siemens Hearing means you can listen to your music even if you require a hearing aid.

Plug a Bluetooth transmitter and control unit called a Tek into your media player or phone and it will transmit audio to your hearing aid using a separate radio system.

It will even allow you to take calls, not quite hands-free because you use the control unit as a mic. But product manager Liz Martin said: "It avoids the feedback problems you get when you hold a mobile phone near a hearing aid."

The system works with Siemens' Life hearing aid but must be set up by a trained audiologist. Prices for the Life start at £1,000 and the Tek costs from £300. It is not available from the NHS.

→ <https://hearing.siemens.com/uk>

Second crash hits Google

Google's Gmail service went down for two and a half hours in the latest problem to hit its systems.

"Lots of people who rely on Gmail were disrupted during their waking and working hours, and we are very sorry," said Gmail site reliability manager Acacio Cruz.

The crash happened when maintenance in one data centre overloaded another one and had a cascade effect. Three weeks earlier the Google search engine itself went down for nearly an hour due to an address error.

The problems come at a tricky time for Google: it is trying to get businesses to use its online applications, for which reliable access is a prerequisite.

Free Virgin 10Mbit upgrade

Virgin Media is to upgrade all its 2Mbits/sec customers to "up to 10Mbits/sec" for free.

The upgrade, and a 20Mbits/sec service, will be introduced from May and will be available to all Virgin's customers. The implementation of a 50Mbits/sec service, announced last year, is due to be completed this summer.

The 10Mbits/sec service costs £14 a month when taken with an £11 a month phone service (which

includes free weekend calls). Virgin claims this total of £25 a month is at least £5 less than the cost of an 8Mbits/sec ADSL+ service.

The company also says that the difference in speed is more than the throughput ratings would suggest because DSL technology is more susceptible to line noise and distance from an exchange, and faces more contention.

It quotes figures from Cardiff-based Epiro showing that Virgin's 10Mbits/sec service deliver a real

average throughput of 6.9Mbits/sec, compared with 3.4Mbits/sec on BT, 2.5Mbits/sec on Tiscali, 2.1Mbits/sec on Orange and 1.2Mbits/sec on Pipex – all services rated at "up to 8Mbits/sec".

Chief executive Neil Berkett claimed Virgin Media's entry-level broadband was now twice the speed of rivals. "With our new 10-20-50 range, we clearly offer the highest-quality broadband service in the UK."

Gazelle browser sinks roots into OS

Microsoft is developing a new browser called Gazelle, which it says is more secure than Firefox, Google Chrome and even its own latest offering, Internet Explorer 8.

The Gazelle kernel is effectively part of the operating system, having exclusive control of system resources and responsibility for protecting them.

One aim is to address vulnerabilities caused by the fact that browsers have to deal with

many sites at once, and that web pages themselves may draw resources from different domains.

Gazelle opens a new browser, with high-level functions such as rendering and HTML parsing, for each domain in its own protected zone; but all links with the host resources, and between browser stances, are handled by the Gazelle OS kernel.

The browser is slower than existing code and the project,

outlined in a paper at www.tinyurl.com/baza29, is currently only a proof of concept.

But other browser vendors are not standing still. Apple's newly released Safari 4 browser, now available in beta (see our review at www.pcw.co.uk/2237900), has gone native in Windows, taking on the Microsoft look and feel. Mozilla, too, has released an update of Firefox, addressing security issues.

Pen links notes to recording



Livescribe's Pulse smartpen records audio as you take notes

A number of smartpens have passed through the portals of PCW Towers over the years, but none of them has ever quite lived up to its promise.

The Pulse smartpen, which is made by Livescribe, sounds as if it might actually be useful, however. It implements in a pen the prime function of Microsoft's excellent Onenote application, which synchronises a recording of a conversation or talk with your notes. Click on any word in your notes later, and the system goes straight to the relevant recording.

Onenote requires a PC, notebook or tablet but Livescribe captures the information entirely by pen, though it does require specially patterned paper to provide positioning. An optical sensor in the 'nib' translates your writing into digital ink and records the audio, and the data can then be transferred to a PC or Mac.

It's not available in the UK yet but we are told it can be bought from Amazon's US site. A 1GB model lists at \$149.95 (£100) and a pack of four 100-sheet pads of the special paper costs \$20 (£13.50).

→ www.livescribe.com

GPS watch keeps watch

A UK firm has launched a watch with a GPS locator, a phone and a panic button that sends an SMS alert to the Masternaut Three X tracking centre. Wearers can be tracked on any browser.

The Lokate watch can be detached from the strap and mounted in taxi cabs or lorries. It costs £295, plus £14.95 a month for the tracking service.

→ www.masternaut.co.uk



Mini-laptops get into touch

The fashionable size for mini-laptop screens is 10in, judging from exhibits at Cebit, and more touchscreen models are becoming available, perhaps because of touch features in the upcoming Windows 7.

Gigabyte showed a swivel-top called the Touch Note M1028, one of three new 10.1in models. A second, the Booktop M1022, has a similar chassis but is a standard notebook that comes with a docking station. The third and prettiest is the slimline Thin Note 1024.

Netbook pioneer Asustek's Eee PCT T91 has an 8.9in touchscreen and a suite of touch-optimised



This Thin Note is Gigabyte's prettiest option

MSI, the Wind U115, has both a solid-state disk (8GB or 16GB) and a hard disk of up to 120GB. You can switch the hard disk

off to save power but still use it as a data store. A sister model, the U120, supports 3G and Wimax.

The company also unveiled a slimline design apparently inspired by Apple's Macbook Air. The 13.4in X-Slim 320 weighs 1.3kg and the thickness varies from 1.98cm to 6mm. MSI claims a battery life of up to 10 hours.

software, Touchsuite, that includes a slider control for Internet Explorer. It weighs 96g, supports Wifi, Bluetooth and HSDPA, and has a claimed battery life of five hours.

The company also showed its combined PC and keyboard, first seen at CES in the US, which has a 5in screen for touch control.

An interesting 10in design from

In brief

Mobile videophone

UK-based Siracom launched the Unidata SQ-3000, a Wifi videoconferencing handset phone supporting the Session Initiation Protocol (Sip) and designed to have the look and feel of a mobile phone. Aimed at business and personal users, it has a 2.8in 320x240 screen and boasts two hours of video calls or nine hours of talk time between charges.



→ www.siracom.co.uk

Save your system

Storagecraft showed its new Shadowprotect disaster recovery software that it says can get systems back up quickly after a crash, even if the software is being restored to different hardware.

→ www.storagecraft.eu

New Scansnaps

Fujitsu Europe was plugging two new fast colour duplex scanners in its compact Scansnap range. The S1500 for Windows and the S1500M for Macs are available now for a recommended retail price of approx £420 ex Vat.

→ <http://emea.fujitsu.com/felg>

Sign of the times

Graphics tablet specialist Wacom showed four new products for capturing digital signatures at sales and hotel reception desks.

→ www.wacom.eu

Whine and roses

And in case you were worried about the economic crisis, here some words of encouragement from California governor Arnold Schwarzenegger at Cebit: "Losers whine but winners move forward in a strong and powerful way."

Clarion makes up its Mind to aid drivers

Many vendors expect mobile internet devices (MIDs) and mini ultraportables to come in forms designed for different markets. US company Clarion showed one pitched as a navigation device but including all the usual functions of a MID.

Clarion calls the Atom-powered device the Mind (Mobile Internet Navigation Device). It is designed to be always on, with access to the web via Wimax or 3G, and it seems to be targeted at motorists. It can draw power from the car battery, which is a boon as its Menlow architecture is a little heavy on the juice.

It has a media player, hands-free telephony via Bluetooth, a camera and GPS. Control is via a 5.2in 800x480 touchscreen.

→ www.clarion.com



Clarion's Mind is designed as an always-on device

Rivals unveil graphics chips

Arch-rivals Nvidia and AMD (owner of ATI) announced new graphics processing units (GPUs) at Cebit.

AMD launched two 40nm graphics chips, the ATI Mobile Radeon HD 4860 and 4830, supporting 1080p HD video. They are manufactured by TSMC, the Taiwanese company that has signed a deal with Intel to develop and make low-drain Atoms (see page 8).

They use 3D engines from the ATI Radeon HD 4800 series and support Microsoft DirectX 10.1.

Nvidia unveiled four GeForce chips for notebooks, the GTX 280M and 260M and the high-

powered GTS 160M and 150M. All are made to 55nm scale to reduce power consumption and Nvidia claims their frame rates are 50 per cent higher than their predecessors.

The chips are entering a depressed market that saw shipments drop by more than a third in the last three months of 2008.

Sapphire Technology showed two ATI-based boards using Vapor-X cooling. The HD 4870 Vapor-X Edition clocks 750MHz at core and has 2GB or 1GB of DDR5 memory clocking 900MHz. The HD 4850 Vapor-X clocks 625MHz and has 512MB of GDDR3 clocking 993MHz.

Asus eyes up Snapdragon

Mini-PC pioneer Asustek is dropping the 7in version of the Eee PC and may bring out a version using Qualcomm's Snapdragon, which employs the ARM instruction set (see page 24).

But Samson Hu, Eee PC business general manager, told *Digitimes* that the company does not yet have any mass-production plans involving Snapdragon.

He denied reports that Asus will phase out 8.9in models completely this year; instead the company will produce a small number for government and niche markets.

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Hyperspace on ARM devices

Bios specialist Phoenix Technology announced that it has ported its Hyperspace instant-on software to the ARM Cortex A8 architecture, the basis of several systems-on-a-chip designed for mobile internet devices and netbooks.

It could also be used in so-called hybrid notebooks such as the Dell Latitude E4200 and E4300, which run on ARM, as well as an Intel processor for telephony and rapid access to common tasks using a Linux kernel.

The company says Hyperspace boots up and down in seconds, providing near instant access to common tasks such as browsing, and access to calendars and email.

The software also logs you on to the best available wireless network and draws little power, reducing battery drain as users do not always need to boot into the full operating system.

→ www.pcw.co.uk/2236378

Archos does an Apple

Media player specialist Archos is to launch a thin tablet based on Google's Android mobile telephony platform, giving it functionality similar to Apple's iPhone.

But the 10mm-thick Internet Media Tablet, as the company styles the device, will have a larger screen at 5in and up to 500GB of storage.

It is powered by the ARM-based OMAP 3 system-on-a-chip from Texas Instruments.

Archos says the device, which will launch in the second half of this year, will provide a "PC-like internet experience" along with "full-width page viewing... and uncompromised TV recording and high-definition (HD) playback".

Archos is also to launch an Atom-powered 9in mini-tablet with a virtual keyboard and handwriting recognition. The 1.7cm-thick device, which sounds similar to an Origami tablet, will weigh 800g and will feature a hard disk with a capacity of 60GB or 160GB.

→ www.pcw.co.uk/2236092

Cheers greet power standard

An announcement of a standard charger for mobile phones was greeted by cheers at Mobile World Congress.

Rob Conway, chief executive of the GSMA industry body, said in an opening keynote speech that most manufacturers and operators have backed the Universal Charging Solution (UCS), which uses a micro-USB link to carry power and meets the high-efficiency targets set out by the Open Mobile Terminal Platform.

They will have a four-star or higher efficiency rating, which is up to three times more energy efficient than an unrated charger.

The system will be on most new phones by 2012 and is expected to halve standby energy consumption. It should cut global demand for chargers by millions.

Notably absent from the list of 17 companies that have signed the agreement were Apple and HTC, though the latter uses mini-USB for charging its current devices. But supporters of the new standard include giants such as LG, Motorola, Nokia, Samsung and even Sony Ericsson, which is notorious for using non-standard connectors.

The one downside of the initiative (unless you happen to

make power adapters) is that no mention was made of plans to extend it to more power-hungry devices for which the mini-USB plug would be too small. As we reported last month, a company called Green Plug has developed a universal power supply that is based on an adapted USB plug, but is compatible with current USB devices.

It uses a plug-and-play system to establish and deliver the power needs of a device. If a power supply that versatile is a step too far for the industry, there seems no reason it could not settle on a standard supply for laptops.

LG cubism challenges Apple's iPhone

Apple does not deign to attend the Mobile World Congress but it has a presence in that every new touchscreen model is measured against the iPhone.

Phones using Google's Android operating system were expected to be contenders, but there were few in evidence. One was HTC's Magic touchscreen version of the G1, but it lacked the Apple magic.

Some thought LG's Arena KM 900 could give Apple something to think about. Caroline Gabriel, of Rethink Wireless, wrote in a blog that the iPhone "still stands head and shoulders above all other touchscreen phones, because other handset makers just don't seem to get what touch is all about. Until now, with LG showing off the Arena".



The user interface provides four customisable home screens by presenting them as the vertical faces of a cube, which can be turned with the flick of a finger.

The same cube interface is also on LG's Windows Mobile-based GM 730. LG says it will be used in all its high-end phones, offering customers a wider choice of models than Apple.

Sony Ericsson unveiled a good-looking new W995 Walkman phone, but its iPhone rival, provisionally called Idou, will not be available until later this year.

Details are scarce but it features a 3.2in 16:9 touchscreen and a 12.1-megapixel camera with a Xenon flash. The company recently signed up to the Open Handset Alliance, which backs Android, but the Idou will use Symbian software.

→ www.pcw.co.uk/2236516



LG's Arena KM 900, left, and Sony Ericsson's Idou

Adobe reflowable PDF fits itself to screen size

Adobe launched a technology that could prove critical in publishing to mobile devices, as the web puts pressure on the print industry.

The Adobe Reader Mobile kit is designed to help developers enable devices to display content using reflowable PDF, which can adjust page dimensions to suit different

screen sizes. It also supports the XML-based EPUB ebook format.

Adobe also previewed its Flash Player 10 for Smartphones, which aims to bring desktop-standard Flash to mobiles. It is compatible with the Android, Windows Mobile and Symbian S60 platforms, and is due for release next year.

"People want to browse the whole of the internet, so they need every feature in the full desktop Flash Player. So we've decided to have a single code base going from phones to desktops," said Zeke Koch, Adobe's director of product management, platform strategy.

→ www.pcw.co.uk/2236566

Threat to flat-rate data links

Low flat-rate mobile data broadband prices are unsustainable and will not last long, according to industry experts.

Growing sales of smartphones and 3G-enabled notebooks, are putting increased pressure on cellular infrastructure without generating enough revenue to sustain investment, particularly because voice revenues are falling.

This means providers are losing money on what should be a cash cow, according to two recent reports from broadband industry analysts Omnitele and Strand Consult.

Chris Marling, editor of the Broadband Genie site, warned that today's prices are low because companies are fighting for market share. "But they realise that the situation is not sustainable and will



Henry Holland designed the skin of this broadband dongle available to new O2 sign-ups for a limited period

cannot be used for Voice-over-IP calls or data-heavy peer-to-peer traffic. "However, the connection will be cheap and far below what we pay for home broadband."

He predicted: "You will see this price change in a number of European countries this year. I expect it will happen in the UK by the first quarter of 2010. These price developments will put pressure on home broadband providers, as a lot of customers will disregard fixed line for a mobile solution." *Ian Williams*

be looking to change packages and turn a profit in the near future."

He said heavy users would be charged more leaving "more leeway in prices to attract casual mainstream users".

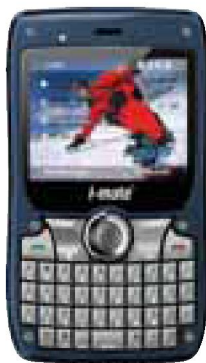
John Strand, chief executive at Strand Consult, expects mobile operators to launch services that

Slot-in phone can drive a netbook

This 810-F smartphone meets the US military's MIL-STD-810F specifications, so it is resistant to dust, humidity, shock and vibration, extreme temperatures and water.

Vendor I-mate got our reporter Ian Williams' Best of Mobile World Congress award for this and three other products it unveiled. One is the Centurion smartphone, little bigger than a smartphone, that has a usable full Qwerty keyboard.

More interesting was a pair of products still in development. One, codenamed Legionnaire, is a fairly standard Windows Mobile



The 'military-grade' 810-F smartphone

touchscreen smartphone; the second, Warrior, is essentially a netbook with most of its innards replaced with batteries.

Legionnaire docks below the Warrior's keyboard, and the combination creates a netbook powered by the phone, but with a full-sized keyboard and screen. You can either run Windows Mobile on the large display or use it as the front end to a remote a PC or Mac. I-mate chief executive Jim

Morrison reckons the Warrior batteries will give around 58 hours of use and charge the phone, too. Both launch this autumn at \$500 (£351) and \$199 respectively.

This isn't the first time we've seen this modular approach and we may see more of it in future.

Powerful low-drain systems-on-a-chip are capable of driving devices larger than mobile phones. A slightly different approach would be to have a mobile phone that could slot into a netbook or laptop and act as its radio module.

The other possibility is netbooks or mobile internet devices will become so compact you will carry them everywhere. *Clive Akass*
→ www.imate.com

Palm dumps the software that made its name

Palm is retiring the PalmOS operating system to focus on the Linux-based WebOS.

The PalmOS drove the first successful pen-driven handheld and once enjoyed the same near-fanatical user base as the MacOS.

But Palm was slow to implement

telephony and lost ground to smartphone makers. It was eventually split into independent hardware and software companies but some Palm handhelds still used the old operating system.

WebOS is still in development and will be introduced with a new

model called the Palm Pre, which will launch exclusively in the US.

The company now wants to move developers to the new OS. but stresses WebOS uses standard applications, so developers will not need to learn new code.
→ www.pcw.co.uk/2236410

In brief

Windows Mobile

Windows Mobile 6.5, the latest version of Microsoft's smartphone software, has a revamped user interface with some gesture controls. It was launched at Mobile World Congress at the same time as a web-synchronisation service called Myphone and an online store for mobile applications. Microsoft plans to rebrand the platform as Windows Phone.
→ www.pcw.co.uk/2236532

Acer handsets

Acer unveiled four smartphones in its first foray into the handset market. The Tempo range comprises the M900 for professionals, the F900 for mobile browsing, the consumer-oriented X960, and the dual-SIM DX900. All use Windows Mobile 6.5 and will arrive by the end of March.
→ www.pcw.co.uk/2236629

Wimax views split

A group of companies pledged at MWC to continue investing Wimax despite predictions that it will be overshadowed by Long-Term Evolution (LTE) cellular links.

The group – including Intel, Cisco, Alvarion, Nokia Siemens, Alcatel Lucent, Motorola, ZTE and Huawei – say Wimax can be deployed now but LTE won't be ready for another three to five years.

Sean Cai, deputy general manager of Wimax for ZTE, said the biggest obstacle to Wimax adoption is the lack of mobile devices that support it.

But GSM Association chief executive Rob Conway said in his keynote speech: "LTE is our future. You can talk about Wimax if you want, but it is a sideshow to this main event."
→ www.pcw.co.uk/2236661

16GB microSD

Memory makers Sandisk and Kingston both released 16GB MicroSD cards, with 32GB said to be coming soon.
→ www.sandisk.com

ARM wrestling with the giants

Netbook war could crack Wintel dominance – or put x86 on to mobile phones. Clive Akass reports

ARM-based netbooks will beat those using Intel's next-generation Moorestown platform on price, match it on performance, and enable a new class of device costing as little as \$150 (£100), the UK chip designer has predicted.

Both companies were at Mobile World Congress (MWC) in Barcelona showing sample mobile internet devices (MIDs) and netbooks based on their architectures.

Netbooks, with elements of both notebooks and handsets, have pitched companies steeped in mobile-phone design against those coming from the PC world. The rivalry will come to a head next year when Intel, which admits it has yet to match ARM on battery drain, releases its Moorestown platform with the promise of a tenfold decrease in idle power.

Like ARM, Moorestown uses a system-on-a-chip (SoC) rather than a standalone CPU. The SoC, codenamed Lincroft, has a 45nm Atom core, graphics, video and a memory controller. An Intel statement said the platform includes an input/output (I/O) hub, codenamed Langwell, with a "range of I/O blocks" and support for wireless solutions. It is unclear whether Langwell is a separate chip.

ARM core designs are used in SoCs made by licensee companies, and it can point to an impressive line-up. Texas Instruments unveiled a new OMAP 4 SoC at MWC. It is capable of full 1080p playback and with a dual ARM Cortex A9 MP core. ST-Ericsson is said to have developed a dual-core design. In addition Nvidia offers the Tegra SoC and Freescale has the iMC.515.

Another licensee, Qualcomm, is in a slightly different position in that it designs its own processor cores using the ARM instruction set, giving the two companies a similar relationship to that between AMD and Intel. Qualcomm claims its Snapdragon SoC, which is to

go multi-core, outperforms systems using ARM designs (see Guy Kewney's column, page 24). But a new ARM core, codenamed Sparrow, rumoured to be destined for an Apple device, will arrive this autumn.

How will these compare with Moorestown on power consumption? The promised reduction in idle power targets a big advantage of ARM SoCs, which were designed from scratch for devices that have to be left on all day. Intel has only recently had to pay much attention to idle power.

James Bruce, wireless segment manager at ARM, says he cannot see Moorestown bringing current drain to ARM levels while Intel chip consumption is measured in watts rather than milliwatts.

He said Intel had just released a chipset supporting HD playback and drawing around 12W to 14W (the GN40, and the new Atom N280 processor launched with it, draw 16.5W between them, according to an Intel slide).

"That does not make it look likely that Intel will be able to bring its Moorestown power level down very much. Nvidia's ARM-based Tegra supports HD on a mobile phone. If you showed a mobile phone manufacturer anything that drew as much as a watt you would be laughed out of the door."

Both Nvidia and Freescale have said their designs could enable

An Atom-powered netbook design from Benq



to have a 45nm Atom core, and ARM has already sampled 32nm designs made by IBM.

All ARM licensees have access to this 32nm manufacturing technology and Bruce says it gives them an added advantage: "Intel has just one process to cover the whole range of processors from low power to servers clocking 3GHz to 4GHz. Our process is optimised for low power."

There is much more at stake in this battle than the netbook market. If Intel succeeds in cracking ultra-low-drain computing it could make inroads into the ARM-dominated mobile phone market; and if ARM succeeds, and takes Linux finally to the mainstream, it could crack the Wintel hegemony for good.

The threat is real enough to lend credence to whispers that Vista successor Windows 7 is being ported to ARM. Microsoft chairman Steve Ballmer has confirmed that Windows Mobile 7, due for release in January 2010, will be optimised for netbooks; but will a phone operating system be able to compete with a platform capable of running full-blown Linux and with a wealth of free applications? And that is not to mention Symbian and Android implementations.

Microsoft is cornered. If it tries to compete on price and features it will undercut its own desktop and notebook products. If it doesn't it could lose market share. Wintel has a lot more than the credit crunch to worry about.

netbooks to be made with a \$100 bill of materials, with products likely to sell in the shops for \$200 or less.

Intel's trump card is the wealth of applications written for the platform. But both the Ubuntu and Xandros flavours of Linux have been optimised for ARM, and Open Office is a fair replacement for Microsoft Office.

ARM showed a Pegatron netbook using a Freescale iMC.515 running Ubuntu. Bruce said the performance was good but, like many device manufacturers, he believes netbooks will be used for browsing, email, networking and media playing rather than office tasks. "Windows laptops are not going to go away," he said.

It's possible that ARM may beat Intel to 32nm scale in the netbook class, bringing new power and cost savings. Moorestown is scheduled



Another Atom netbook. ARM-based products should be thinner

You can help map the stars

Astronomers are asking for your help in exploring 250,000 galaxies as part of a project to map the universe.

Humans are still better at pattern recognition tasks than computers and there are a lot of people online willing to check pictures taken of distant galaxies.

More than 150,000 signed up for a Galaxy Zoo project 18 months ago to judge from indistinct images whether a galaxy was spiral or elliptical, and the direction of its rotation. No astronomical knowledge was needed as they were just assessing shapes.

The response, which resulted in 80 million classifications, astonished the organisers. The volunteers also identified 3,000 cases of galaxies in collision, a relatively rare event.

Now Galaxy Zoo 2 has been launched, in which volunteers will be asked to look deep into images to find unusual details.

One of the project founders, Dr Chris Lintott of Oxford University,



These images from the research project show phases in the life of galaxies. On the left are two 'young' blue galaxies with nodes of star formations in the spiral arms; in the centre a star formation has died out and the spiral is fuzzier; on the right are two elliptical galaxies described as 'old, red and dead'

explained: "Galaxy Zoo provided us with a rough guide to the sky and now we want our users to fill in all the details and create a real Hitchhiker's Guide to the Galaxies."

Dr Kevin Schawinski, of Yale University, said the response from the first phase of the project was

overwhelming. "We've been able to learn a lot about how galaxies evolve and how they relate to their environment. With the detail from Zoo 2, we'll be able to discover more about how galaxies work."

Details of how to volunteer can be found at www.galaxyzoo.org.

AMD spins off fabs and launches chips

AMD has finally spun off its manufacturing operations and announced a raft of new chips.

Its chips will be made by a new entity called the Foundry Company following a deal with the Advanced Technology Investment Company (ATIC) and venture capital firm Mubadala Development Company. AMD retains a controlling share.

It has also launched two new 40nm graphics processors, the ATI

Mobility Radeon HD 4860 and 4830, which it said would redefine mobile PC entertainment.

Earlier it revealed a six-core Opteron chip, codenamed Istanbul, due to be launched later this year. The processor can be used as a slot-in replacement for Opterons on systems with two or four sockets.

John Fruehe, AMD's director of business development for servers and workstations, wrote: "Despite

putting more cores in the processor, we managed to keep it in the same power and thermal ranges as our existing 'Shanghai' processors."

AMD also announced its first 45nm triple-cores, the Phenom II X3 720 and 710, clocked at 2.8GHz and 2.6GHz respectively. They were launched with three quad-cores, Phenom II X4 910 and 810, both 2.6GHz, and the 805, at 2.5GHz.

● See review page 60.

New Vista PCs 'will get free Windows 7 upgrade'

Microsoft is said to be planning to offer a free Windows 7 upgrade to people who buy Vista machines in the run-up to the launch, which could be as soon as next Christmas.

A draft of an upgrade program sent to PC makers, and put on the Malaysian TechARP site, urges people not to hold off PC purchases until Windows 7 is available.

A similar scheme before the Vista launch caused a furore when upgrade discs took weeks to arrive.

Microsoft also got into trouble over a Vista Capable logo placed on machines said to be capable of running the operating system.

It turned out many systems could not support the advanced graphics, with the result that

Microsoft became embroiled in an embarrassing class action.

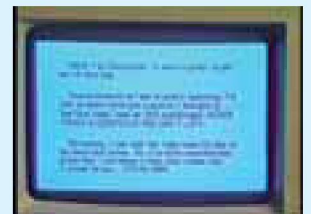
Windows 7 uses the same kernel as Vista so the transition may not prove so troublesome as the one to Vista from XP. A release candidate version, expected to appear in April, is expected to include a number of new features including multi-touch support.

Retro

Hello, I'm the Mac

It was a dinky little box, looking more like a toy than a real computer. And truth to tell the first Apple Mac was indeed little more than an expensive toy... at \$2,500, well over \$5,000 (£3,400) at today's prices and three times the price of the Sinclair QL, launched days earlier with a similar spec.

But it was the first machine to bring the graphical user interface to the consumer market. And with Steve Jobs doing the marketing (which added \$500 to the price) it was a sensation from the moment he took it from its packaging for an audience of cheering Apple fans in the first sales pitch ever to make history. Preserved for posterity on Youtube (below) is the



"Hello Mac" from original video. See www.tinyurl.com/2yzaml

moment the machine introduced itself: "Hello. I'm Macintosh. It sure is great to be out of that bag."

Talking machines were old hat even in 1984 but people were impressed. However they quickly realised that the unsexy IBM PC was faster and had a lot more useful software. Sales picked up when the Mac's memory was boosted from 128KB to 512KB but they never matched those of the PC.

The Mac was before its time but all that marketing spend made people aware of the GUI, and the fact that you did not need a degree in computer science to use a computer. Ironically, the Mac paved the way for Windows.

Read our original review, starting on page 47.

INTERACTIVE

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LETTERS

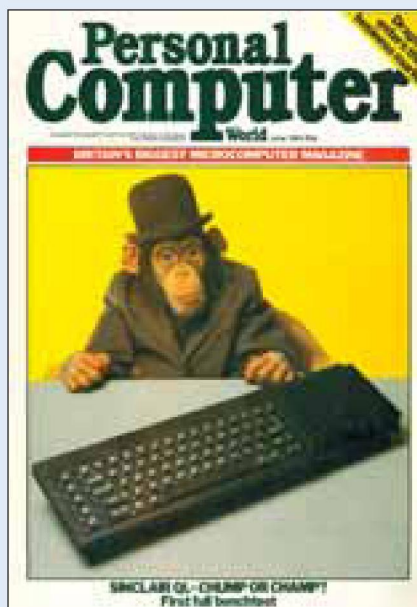
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★ LETTER OF THE MONTH

Let's see 'Brains, Apricots and Dragons'

Last year I emailed with a request for early back issues and when I learned that editions of PCW from this era were unavailable, I was so disappointed that I just could not bring myself to reply. However, the reprinted Sinclair QL review in the April issue is exactly the sort of thing I was hoping for.

The QL is the computer I always wanted, but could never afford. It represented such a lost opportunity for a British computer company, and is something I still regret never being able to own. In the same vein, I would love to see a reprint of the Sirius 1 Bench test from, I think, 1984. I took that issue (the one displaying Chuck Peddie's green image on the monitor)



with me on the bus and read it while waiting for an interview at Sheffield University. I kept it until it fell apart and, even though I remember precisely nothing else about it, that issue represents the beginning of an IT career which has seen me, so far through 25 years, and 300 issues of PCW.

Let's see the Superbrains, Newbrains, Nascoms, Apricots,

Orics and the Dragons (I did own one of those!). If you ever do recover those old issues lost in some soggy field by the storage company, give me a call and I will take them off your hands, for a small consideration, of course.

Ed Parr

LOST IN VEGAS

The logic of omitting any of the Sony Vegas packages in your March video-editing group test review, escapes me. They must be among the closest competitors to Premiere Elements.

I suspect that Movie Studio 9 Platinum (£47) or Movie Studio 9 Platinum Pro Pack (£76), would give Premiere Elements a run for its money and I was keen to read your opinion. I'm disappointed, because I'm in the market for a new editing package and without Sony Vegas in the review mix, your article does not represent a comprehensive test of the top packages for non-professionals.

Also, your habit of consistently recommending Pinnacle Studio, leaves me bewildered: in a

previous issue you made it a best buy, despite its stability issues.

You politely referred to 'performance issues'. Come on, tell it like it is. It's a 'crasher'. I know, having wasted money on the last two versions. In the long term, it's unreliable.

It doesn't matter how simple, logical or practical the interface is. If the program is prone to crashing, it means it's deeply flawed and you shouldn't be recommending it.

Bill Bruen

PCW replies: At the time of testing, Sony did not have a suitable HD-capable product and so was not included in the group test, but we hope to review the new packages in a future issue.

RETRO ISN'T DEAD

I really enjoyed the article on the Sinclair QL (PCW April 2009). I hope you will make retro computing a regular feature.

Don't assume retro is another word for dead. If you want proof, go to <http://trs-80.org.uk> where you can find a quarterly PDF newsletter all about the TRS-80.

Dusty Miller

QBASIC IN VISTA

In your March letters Roy Fear asked how he could run a Quickbasic program full screen on Vista. I run Qbasic programs like this on my Vista laptop.

Download the free Dos emulator from www.dosbox.com. Read the README file and mount a folder as the C: drive in

the configuration file, but once you've done this, all the world of Dos 5 and Dos 6 comes back to life – all the old games, batch files and other programs that won't work from the XP/Vista Dos Prompt now work again. You can control the emulator speed (by using Ctrl & F12) to set the right speed for your programs. While Alt & Enter toggles between Full Screen and normal window on XP and even on Vista!

Roy's Snowflake program sounds fascinating. Could he send the code to me or could you put it on a future PCW CD/DVD?

Andy Child

BASIC PROBLEM

I have long been a devotee of programming and have carried my legacy versions of GWbasic and Qbasic from the days before Windows. Now they will not properly display on XP or Vista.

Visual Basic is probably good for what it was designed for but I wanted a Basic for calculations and suchlike. And then I came across Microsoft Small Basic (<http://smallbasic.com>).

I downloaded it with the 'Introduction' and immediately got stuck. How can anyone release a programming language without publishing the Syntax and Commands list? You cannot write a compiler without these so they must have them. An email to the design team, using their web email form, just bounces.

Can you persuade Microsoft to release the information?

When I lectured on software, I would say "You cannot go anywhere without knowing your destination, especially if you go hand in hand with anything as idiotic as a computer!"

Alan Gordon

HIBERNATION TIP

I have a PC with a 20GB primary partition. Nearly all the remaining space suddenly disappeared – down to about 500MB. I tried all the obvious culprits with no avail. Then I discovered there was a large 3.5GB file called hiberfil.sys in the root directory. Windows uses this



Clive Sinclair is among the pantheon of British technology innovators

file during hibernation. It takes a snapshot of everything running on your system, copies it and turns off most of the hardware.

Two days before, I upgraded the memory from 1GB to 4GB. The operating system had grabbed more disc space to accommodate the extra memory. Since I never use hibernate, it was simple to turn off the feature in Control Panel. My problem was a very unexpected consequence of a simple memory upgrade.

Derek Camfield

MICROSAURS

Great to hear PCW has published a retrospective Sinclair QL review and an interview with its designer David Karlin.

There are many other interesting British people with a long background. Why not launch a series 'The Microsaurs' of interviews with Sir Clive Sinclair, Alan Sugar and others. QL designers Rick Dickinson and Jan Jones are interesting people who made their way after Sinclair.

Urs König

GET THE SERVICES YOU DESERVE

I found the article 'Get the Services You Deserve' in PCW April 2005 very useful. This explained how to get services with Windows XP and was essential for optimising my desktop with XP. Recently, I bought a Dell Inspiron 1525 laptop. Unfortunately, this came with Vista, an operating system I

hate. I much preferred the simplicity of XP.

Did you produce a similar article of for Windows Vista? I want to stop all non-essential services for the operating system.

Brian Taylor

PCW replies: For some tips on how to improve Windows performance see page 26.

VIRUS DANGER ZONE

Since 19 January, 2009 Zone Labs has stopped providing new anti-virus update signatures for Zone Alarm v6.5. Users may not be aware of this because the program always now says the virus definitions are up to date. I only spotted this by chance.

Zone Labs now provides virus update signatures only for v7. However, v7 requires XP SP2/Vista but I continue to use XP SP1 because of the requirements of some programs I use. How many v6.5 users now have virus infected machines because of Zone Labs' policy?

John Taylor

SPEED BOOST

Thank you for the Broadband problems and solutions feature in PCW April. I was experiencing

abysmal download speeds and without much hope, I tweaked my Registry by downloading the TCP optimiser and selecting the automatic setting.

My download speed boosted to a minimum of 3.3 times the previous best speed and a maximum of four times.

I thought this would be temporary, but it has continued and has exceeded the maximum speed of 6.5Mbps/sec calculated to be relevant to my local telephone exchange.

Wilf Berger

MORE VIDEO TRACKS

In your video-editing software group test (March 2009) you stated that Videostudio X2 has a meagre two video tracks. However, if you go to the timeline and click on the 'Overlay track manager' icon and you'll find you have access to seven video tracks – the same as version 11 plus.

Roy Taylor

Ken McMahon replies: You're right. Videostudio Pro X2 has an additional five overlay tracks accessible from the Overlay track manager, making seven video tracks in all. Apologies for the error.

WIN
Next month's prize for the letter of the month is a 32GB Maxell Solid State Drive

Maxell's 32GB Solid State Drive (SSD) is the world's first portable dual storage device that combines advanced eSata technology and robust USB2 connections. Designed to replace existing hard disk interfaces, a fundamental advantage of eSata is its exceptional transfer speed, which is around three times faster than USB2. A unique storage device that works instantly, rapidly and reliably, SSD is the revolutionary means of storing data, essential for those who have ever experienced the stress and frustration of a slow data transfer or a broken storage device.

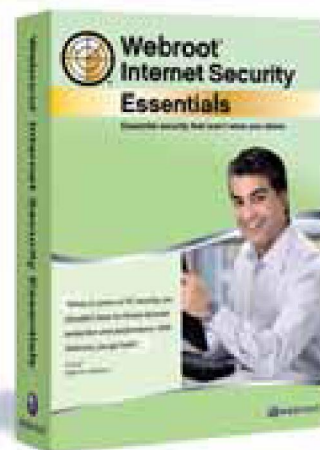
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Gordon Laing



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Two into one can go

Canon's Powershot SX1 IS offers the first viable alternative to carrying a separate HD camcorder

The dream of convergence is of two different technologies successfully merging into one: in other words, why buy two devices, when one will do the job of both? Sadly the reality has often been a compromise, with the converged product doing neither job very well.

A great deal depends on your expectations: a multifunction printer rarely boasts the latest generation of printing or scanning technology, but the quality may be good enough and the convenience far outweighs any downside. Media PCs struggle at times to match the simplicity and reliability of a domestic set-top box, but many of us are willing to work around their foibles to enjoy the flexibility they deliver to a home-entertainment enthusiast.

In the brave world of convergence, though, one category stands out in terms of demand and

forgiveness for thinking they're fast converging into the same product. At first I thought the same, but look beyond their form factors and you'll find considerable technical differences that should make one more suitable than the other.

Let's start with lenses. Most camcorders have 10x or 12x optical zoom ranges, which the SX1 IS clearly beats with its 20x zoom; but it's important to note video and still products rarely start at the same point. Most camcorders have a root focal length equivalent to around 40mm (ie upper thirties or even lower forties) on a non-digital SLR, thereby lacking true wide-angle coverage. In contrast, the SX1 IS will zoom much wider to an equivalent of 28mm, which makes a huge difference capturing stills or video.

Unusually for a stills camera, the SX1 IS can optically zoom while filming, but will only do so quietly at its slowest speed. Most camcorders offer a range of zoom speeds from gentle to very quick, with barely a sound and, while their zoom ranges may not be as long or wide, they often boast brighter focal ratios which really help in low light.

In terms of audio, the SX1 IS delivers great results with its built-in stereo microphones that are a match for most camcorders, but there's no input for an external microphone. Stills cameras such as the SX1 IS inevitably feature superior photographic controls, but ergonomically they rarely handle as well when capturing video.

Handling is a critical factor not just in terms of physical comfort and control, but also the ease with which the camera exposes and focuses in typical situations. I thought the SX1 IS was pretty good at focusing and metering while filming, but dedicated camcorders were better at capturing typical consumer handheld footage. Like the EOS 5D Mark II DSLR before it, the SX1 IS seemed happier filming with more care or on a tripod.

While the handling and operation of a dedicated camcorder is preferred for video, it's hard not to be won over by the SX1 IS. Along with respectable stills, it delivers roughly the same video quality as a budget HD camcorder with a bigger lens for a similar or lower price. Could this first truly successful hybrid model spell the end of the budget HD camcorder market? **PCW**

'Could this first successful hybrid model spell the end of the budget HD camcorder?'

disappointment: most of us would love to own one camera that captures decent stills and video.

Digital still cameras and camcorders have been converging for years, but most have failed to convince enthusiasts that one model can do it all. Movie modes on still cameras often suffer from noisy video, poor audio and the inability to optically zoom, while stills modes on camcorders typically capture relatively low-resolution images with little photographic control.

With each generation, though, the capabilities improve and I've just tested one that comes closer to the dream. Canon's Powershot SX1 IS is primarily a 10-megapixel stills camera with a 20x optically stabilised zoom lens, but it can also capture full HD video in the 1080p format with surprisingly good quality and clean stereo sound. I'd say the video quality is so good it offers the first viable alternative to carrying a separate HD camcorder.

HD camcorders can now grab high-resolution stills along with their full HD video. With both these and the SX1 IS offering long zoom ranges, flip-out 16:9 monitors and the ability to capture high-resolution stills and 1080p video, you'd be

Barry Fox



barryf@pcw.co.uk

The Symantec web tangle

It's not easy to get the Norton security suite vendor to sort out a virus – and it could cost you

It was unhappy coincidence that colleague Clive Akass and I were in the same week asked by friends for help with Norton virus protection. We both found ourselves being taken round in circles by the Symantec website, looking for the free support which is promised for recent products, and being sucked down blind alleys that led only to paid support. (For Clive's experience see The Test Bed at www.tinyurl.com/bn9qys).

This happened just as my column on Symantec appeared in the same issue as two readers' letters griping about Symantec. The company has finally employed a press spokesperson who takes things seriously. So I have some hard fact advice for anyone else trapped in the Symantec website maze.

I had been asked to help install Norton 360 on a PC that had never previously been online.

United States version and trap the user into paying for international support calls.

Using the dropdown location menu to reach the UK page provides FAQ online help on installation and common issues. If the FAQ route fails to help, it will direct you to the free support page (www.tinyurl.com/cjy7rq).

This starts a Chat Instant Messenger session, with the option to send an email or phone a UK number (020 7616 5813).

When I looked there was a warning for phone help: 'Estimated wait time: 30 minutes'. The email option is through a web form that can be accessed at www.tinyurl.com/bdvorz.

Some queries will refer you back to the Chat option for an online remote check of the PC. The PC is unprotected online if the installation failed, so phoning may be safer than visiting the website.

Why doesn't Symantec give this advice plainly on a sheet with the product? Probably because no-one at Symantec has observed a novice user.

And why are Norton download products the same price as boxed versions? The boxed version includes a Recovery CD, which is vital when the PC won't boot. But a customer who buys via download has to struggle with poor instructions and burn their own Recovery disc, with no guarantee it will work.

Symantec assures me that the download purchase comes with instructions on how to download and burn the Norton Recovery Tool ISO file. I have been asking Symantec for at least two years whether anyone has ever watched how a novice copes with the instructions offered at www.norton.com/recoverytool.

Before buying Norton software online, look at these instructions. If they look like gobbledygook, go to a shop that sells boxed versions, often cheaper than Symantec's website.

You can also compare Symantec's prices with other protection packages, such as Kaspersky.

If Symantec's online pricing causes a loss of sales, it may take notice of the ordinary user. PCW

'If Symantec's online pricing causes a loss of sales, it may take notice of ordinary users'

Within five minutes of connection via Talk Talk, and long before Norton had installed itself, a dire warning came up on screen saying the PC was 'critically infected'.

This came from a rogue program called MS Antispyware 2009 (MSAS) which throws up messages saying 'Windows Security Centre reports critical infection' etc. MSAS then sends the user round in circles asking them to 'Click to Activate' and pay.

Googling for a way to remove MSAS can make things worse, leading to sites that change the desktop and steer the PC to Casino gambling sites. I escaped by keying Ctrl & Alt & Del, closing all programs, and then downloading Windows Defender, a free program from Microsoft that hunts down malware (see www.tinyurl.com/2wsok6).

But the Norton 360 installation failed with the error message 'Contact Symantec Support'.

Yes, but how? Free 'one click' interactive support is only available from within the program after it has installed.

Outside a failed installation, go to the Support page on the symantec website www.tinyurl.com/c3m8ql. The Symantec home page may default to the

Links

Symantec support policies: <http://tinyurl.com/d8o6x9>
To check whether your product is eligible for free support: www.norton.com/update.



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Guy Kewney



guykewney@gmail.com

Puff the magic Snapdragon

The netbook world is going to get a surprise. Qualcomm's speedy system-on-a-chip looks like it will blow away its Intel rivals

Intel, my sources tell me, may be frightened of ARM PCs running Linux. I saw several of these at the Mobile World Congress, and they were impressive. They are smaller and lighter than X86-based machines, have their own battery built in for a day (or two) of use and they are fast.

The unexpected factor in the ARM architecture is the decision of Qualcomm to license the instruction set. Not the design at all. Just the instruction set. It will run any code written for ARM processors.

The machines I saw were Snapdragon designs, built around a core processor called Scorpion. Apparently "Snap and Dragon sounded fast and fierce," confessed one senior executive from San Diego.

Some benchmarks had to be attempted. They demonstrated one dual-core Snapdragon chip

patents, but they are impressed with Scorpion cores, and amazed at Qualcomm's roadmap for twin and quad-core devices on 45nm silicon.

One consultant said: "The rest of the world seems to have assumed, quite understandably, that ARM designed the architecture, and so that's as good as the processor can get. I think ARM has taken its eye off the target. It should be re-engineering the baseband design."

By the baseband, they mean the little tricks that speed up communication between processor and memory; between dual cores and I/O, between communications PHY and protocol stacks, and between OS threads and applications.

"It remains to be seen," said one exec inside Qualcomm at the show, "whether other operating systems, like Symbian, can turn themselves into genuine multithreading platforms like Linux."

"But where you have a genuine multithreaded OS, the new architecture of Scorpion means faster multitasking for the user."

The world of netbooks is about to get a real surprise. We've got quite a few and they aren't famous for performance. Light weight, yes. Low power consumption, yes. But blinding graphics? Stonking application processes? Native integration of CPU with comms processing? No, there have had to be compromises there.

Intel is very capable of pointing the total intellectual capacity of its chip designers at the X-Scale architecture and coming up with something at least as good as Snapdragon. In reality, Intel has other projects, most of which centre around the X86 family. It has to fight off Via/Centaur, for example in the low-power market – where it has to do better.

I don't believe in Mobile Wimax. And I don't think Intel will turn to technology advances as its first weapon to bring Linux distributions in line. I think it will use its financial muscle, playing favourites and influencing standards bodies. By the time Intel wakes up, Snapdragon will have a two-year technology lead over all other ARM-based implementations, and a three-year lead in the netbook Linux market.

And by 2010, I expect that market to be very big, and quite possibly bigger than the Windows equivalent. **PCW**

'By the time Intel wakes up, Snapdragon will have a two-year technology lead...'

running at 600MHz, but capable of reaching 1.2GHz during 2009. Some of the speed must have been due to the exclusion of Windows Vista. Compare the Linux performance as seen on some X86 engines in netbooks and it's fast. Faster than the X86 chip could be.

Intel makes an ARM-based design, the X-Scale family – originally built by Intel itself and then, when the company finally accepted that its silicon skills were not appropriate, the fabrication was sold to Marvell. Can X-Scale compete with Snapdragon? I would say not this year, and maybe not even next year either.

Inside Intel, my sources tell me of rage and fury, at the news that several popular Linux distributions are going to pre-install on these hand-sized boxes, with ARM-based silicon. That isn't what Intel has been sponsoring Linux for, and the sense of betrayal is deep, say insiders. "Why should we pour money into Linux developers just to see them divert the effort into stuff without X86 chips?" asked one engineer.

Many people I interviewed about Snapdragon were hostile to Qualcomm and felt they were being over-charged for Qualcomm-owned

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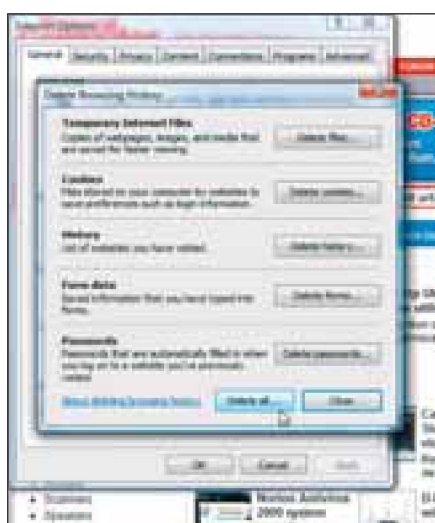
Will Stapley shows you how to revitalise a sluggish XP or Vista PC

Cast your mind back to when you first switched on your new PC and you'll most likely remember Windows booting at lightning speed and applications loading in what felt like an instant. However, if left to their own devices, it doesn't take long for both XP and Vista to become lethargic; programs take an age to load, remnants from applications that supposedly uninstalled themselves start to clog up the system, and boot times slow to a crawl.

Thankfully, it doesn't have to be this way. In this feature, we'll show you how to breathe new life into both Windows XP and Vista without resorting to buying new hardware or, worse, a new computer. As you'll soon discover, there's lots of software available to help you out, but with a bit of insider knowledge you can get tinkering without the need to spend any money.

Housekeeping

Before we look at software applications and advanced tweaking techniques, it's worth recapping some of the simpler ways to keep Windows running smoothly. One of the best ways to reduce clutter and improve



Deleting temporary internet files will free up storage space

Unfortunately, even if a program's uninstall wizard tells you everything's been removed, there's a chance some traces will still remain, with background services and rogue Registry entries being among the most common. We'll explain how to deal with problems such as this a little later. (If you're unfamiliar with the Registry or need a refresher, see our feature on page 32)

As well as removing old applications, it's sensible to make regular use of your web browser's own housekeeping utilities, which will remove items such as temporary internet files – the reclaimed disk space will certainly be useful if you're running low on storage.

performance is to uninstall applications that you no longer use. Many will have components that run in the background as soon as you boot into Windows, taking up valuable system resources without you being any the wiser. Head to Control Panel and click on 'Uninstall a program' (Vista) or 'Add/Remove Programs' (XP) to see which applications are currently installed.

Windows tools

Both XP and Vista have utilities that, if run regularly, will give performance a boost. One is Disk Defragmenter, which aims to speed up access times by reorganising how data is stored on your hard disk. In Vista, you can schedule Disk Defragmenter to run daily, weekly or monthly, however in XP you have to set it up using the Schedule Task Wizard (found in

Control Panel > Scheduled Tasks). Choose 'Add Scheduled Task', click Next then Browse. Then paste the following location %systemroot%\system32\defrag.exe into the File Name box when it opens up the file dialogue box.

Another tool available in both XP and Vista is Disk Cleanup. This scans your PC and reports back with various options, including deleting files that are no longer required. You can launch this by typing **cleanmgr.exe** into the Run box on the Start menu.

The easy way

There's no shortage of commercial, shareware and free software that promises to boost performance levels in Windows. If you want to keep your spending to a minimum, you can use software that tackles just one aspect, such as cleaning the Registry, tweaking hidden Windows settings or boosting Windows performance. Alternatively, you can pick a suite that handles all these tasks from a single interface. There are far too many utilities to cover individually, so we'll give you a quick run-down of the most common types.

If you've installed and uninstalled a large number of applications on your PC, the Registry will most likely be full of invalid entries. Although these are often harmless, they can occasionally cause system crashes.

Delving into the Registry and attempting to fix problems yourself isn't the easiest of tasks, but there are plenty of utilities to help you out. Registry Cleaner from PC Tools (www.pctools.com) is one such utility and costs £29.95 for a three-PC licence. Alternatively, you can opt for a free Registry tool called Ccleaner (www.ccleaner.com). Both work in a similar way, scanning for entries referring to software, files or services that are no longer installed on your PC. If any invalid or erroneous entries are found, they will be included in a report at the end of the scan, and you can then decide whether or not to delete them. As with any such cleaner, you should always make a backup of the Registry before running the tool; most cleaners will automatically save a backup for you. You

can read more about the Registry, including how to manually edit it and back it up, on page 32.

However, it's important to keep in mind that a 'clean' Registry won't make a huge difference in terms of how fast Windows runs. It may appeal to the tidy-minded, however, and you may well solve some odd problems with file associations and program shortcuts. Similarly, although most cleaners will offer to compact the Registry, you're unlikely to save more than a few megabytes, which in these days of multi-gigabyte hard drives isn't much, although if you're trying to eke out a few more months out of an ageing PC it might be more valuable. What they can do, though, is reduce the chances of system crashes caused by invalid Registry entries.

Speed, not style

While fixing problems such as a cluttered Registry might help Windows run more smoothly, you'll get more of a boost in performance simply by reducing the amount of strain Windows places on your PC.

Taming the visual effects in XP and to a greater extent Vista is the best place to start, especially if you're running a PC that only just meets the minimum hardware requirements. You don't necessarily need to invest in any software to make these changes – right-click My Computer, select Properties and then click the Advanced tab (or the Advanced System Settings link in Vista). Now, under Performance, click Settings and select the 'Adjust for best performance' option. It won't look quite as attractive, but you should experience a decent performance boost. Note though, that if your installation of Vista has defaulted to running the Aero 'Glass' theme with translucent windows and menus, reverting to the classic Windows theme may – surprisingly – slow your PC down. The reason is that the Vista Desktop Window Manager (DWM) renders the user interface using the Direct3D capabilities of your graphics card's hardware. With the classic Windows theme, as in Windows XP, the UI is rendered in software using your

CPU. This is why in XP, disabling unwanted graphical effects can speed up your system.

If you want to delve a little deeper into adjusting Windows settings, there's a range of software to choose from. Tweak UI, part

Tweakvista can boost performance and adjust various Vista settings

Free Windows toolkit

With so many options, deciding which software to use in order to keep Windows in tip-top condition isn't easy. Below, we've listed some of the best utilities, all of which are free. There are plenty of alternatives on offer, though, so don't treat this as an exhaustive list.

Adaware Free

www.lavasoft.com

Rogue services can be installed by all manner of malware. Adaware Free is easy to use and will scan for and remove spyware.

Autoruns

www.snipurl.com/bxti3

Lets you quickly view all items that are loaded when you boot into Windows and if appropriate, disable them.

AVG Free

<http://free.avg.com>

All your PCs should be protected from viruses. AVG will keep them at bay and benefits from regular virus updates.

Ccleaner

www.ccleaner.com

Aimed specifically at those looking to remove unnecessary files and Registry entries, Ccleaner is free and simple to use.

PC Tools Firewall Plus

www.pctools.com

An easy-to-use firewall that does its job with the minimum of fuss and bother, but which has lots of advanced options.

Process Explorer

www.snipurl.com/bzcek

Can be used in place of the standard Windows XP/Vista Task Manager and offers far more detailed information on running processes.

Windows Defender

www.tinyurl.com/dcwsve

Free Microsoft anti-spyware tool that's built in to Vista but is available for XP users to download.

Zonealarm

www.zonealarm.com

Vista comes with its own built-in Firewall, but Zonealarm offers more control and will help stop Windows being slowed down by attacks from the internet.



of Microsoft's collection of Powertools for XP (downloadable free from Microsoft at www.tinyurl.com/2meyw), offers plenty of advanced tinkering for XP users, all via a graphical interface. As well as customising the look of XP, it can boost performance by disabling special effects including shadows and fading menus. Tweakvista is a commercial application for Vista users (\$19.95, www.stardock.com) and offers similar functionality to Tweak UI; there's also a free version available with a limited feature-set. Alternatively, Tweak VI (www.totalidea.com) is a free Vista customisation tool.

System suites

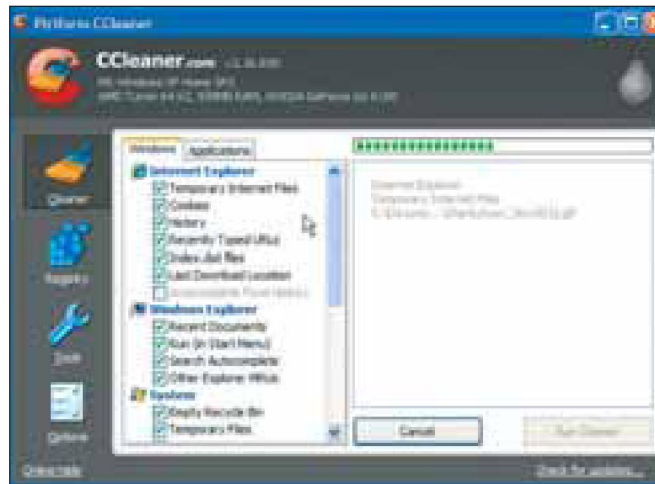
If you would prefer to keep all your tweaking activities under one roof, there's no shortage of system suites available. Tune-up Utilities 2009 (£29.99, www.tune-up.com) is popular and will scan your PC, looking for problems to solve and ways to boost performance. As part of this, it will check the Registry for rogue entries, suggest possible tweaks to the Windows interface and offer advice on how to reduce the number of applications that load automatically when you switch on your

'Viruses and spyware can cause Windows to slow to a crawl'

PC. Tune-up Utilities also comes with a selection of tools that let you manually make changes, including a Registry editor.

Uniblue Speed Up My PC (£19.95, www.liutilities.com) is a similar suite, offering memory optimisation and more, while Iolo System Mechanic (\$49.95, www.iolo.com) aims to boost gaming and internet performance. PC Tools Desktop Maestro offers a smaller range of tools, but is handy nonetheless.

Although they promise much, you're probably wondering whether these commercial applications are worth buying.



CCleaner will clean your Registry for free, but be sure to back it up first

the network address translation (Nat) firewall in your router can leave you vulnerable), along with anti-virus and anti-spyware utilities. You can buy complete protection in the form of a suite (Norton Internet Security, McAfee Total Protection and Panda Internet Security are

If you've a decent level of Windows experience and knowledge, it's quite likely that you could perform most, if not all the features offered simply by getting your hands dirty. However, it can be very time consuming; having everything accessible via a few buttons within a single interface is undoubtedly a simpler option.

One worry with any application that promises to speed up your PC is that you often have very little idea what it's doing. If the application in question is a little heavy-handed, it may end up removing Registry entries that appear redundant but are still required. It's therefore best to always create a System Restore and backup the Registry before you run any of the features. Alternatively, you might want to create an image of your hard disk – see the box on imaging on page 30 for more information.

Under attack

It shouldn't come as a surprise that viruses, spyware and other malicious software can all cause Windows to slow to a crawl. Hopefully you already have adequate protection running – if not, consider it a top priority.

All PCs on your network should have a software firewall in place (simply relying on

just three examples), but if you're prepared to mix and match you can opt for free utilities. AVG Free (<http://free.avg.com>) and Avast are popular free anti-virus packages with spyware protection, while Spybot Search and Destroy (www.safer-networking.org) and Adaware Free (www.lavasoft.com) can both add extra spyware protection.

Windows Vista comes with its own adequate firewall, but there are some free alternatives that offer much more control, including Zonealarm (www.zonealarm.com) and PC Tools' Firewall Plus (www.pctools.com).

Advanced tweaks

Aside from using tweaking utilities as first aid, if Windows is still running slowly it's best to take a look at exactly what Windows processes are active. Task Manager is the built-in Windows tool accessible by pressing Ctrl & Alt & Delete, and will give you an overview of how your PC is running. Under the Applications tab you'll see a list of all active programs (this is the same list as you'll see along the Windows Taskbar). To see how much CPU and memory an application is using, right-click its entry in the Applications tab and select Go To Processes. You'll then be taken to the Processes tab, and the process linked with the application in question will be highlighted; you'll also see its CPU and memory usage. Click on the CPU tab and the list will be ordered in terms of CPU usage, which lets you quickly discover which are the most power-hungry applications.

Process Explorer (a utility created by a company called Sysinternals that was subsequently acquired by Microsoft) is an alternative to Task Manager and offers a far more detailed picture of exactly how your system's resources are being used. Best of all, it's a free download for both Windows XP and Vista (www.tinyurl.com/ys2zq2).

As well as displaying a regularly updated list of all running applications, you also get details on the Registry keys associated with each process along with which Dynamic Link

Using Autoruns to improve boot speeds

The Autoruns application mentioned in this feature can have a big impact on boot times. To test it out, we used it on an ageing Windows XP laptop littered with various bits of software. Without any tinkering, it took the laptop a rather lethargic three minutes and 40 seconds to fully boot into Windows and have an Internet Explorer window up and running.

Firing up Autoruns, we noticed lots of services that were no longer required, many from old software installations. After disabling all unnecessary third-party services,

the boot time shrank to just over three minutes. We then returned to Autoruns and via tabs such as Logon and Drivers, removed yet more clutter, including entries for Quicktime, Adobe and Google, while making use of the Autoruns' 'Search Online' feature for those we were unsure about.

The end result was Windows booted in two minutes and 30 seconds – over a minute quicker than the original boot time. Not bad for an old laptop, especially considering it took just 15 minutes to apply all the changes.

Windows services

XP/VISTA	NAME (VISTA PREFIX)	FUNCTION	XP (SP2/3) DEFAULT SETTING	VISTA (SP1) DEFAULT SETTING	PCW RECOMMENDATION
XP	Alerter	Sends administrative alerts	Disabled	N/A	No change
Both	Application level gateway service	Supports protocol plug-ins for shared internet connections and the firewall	Manual	Manual	No change
Both	Application management	Offers extra services to application installers	Manual	Manual	No change
XP	Automatic updates	Needed for Microsoft's Windows Update feature	Automatic	N/A	Manual
Vista	Base filtering engine	Firewall management	N/A	Automatic	No change
Both	COM+ Event system	Message distribution for COM objects	Manual	Automatic	No change
Both	COM+ System application	Manages and monitors component configuration	Manual	Manual	No change
Both	Computerbrowser	Keeps a list of all the computers on the network	Automatic	Automatic	No change
Both	Cryptography services	Manages signatures and certificates	Automatic	Automatic	No change
Both	DCOM server process start	Start functions for DCOM processes	Automatic	Automatic	No change
Both	DHCP client	Receives IP addresses and DNS server allocations from the DHCP server	Automatic	Automatic	No change
Both	Distributed link tracking client	Tracks data links to removed files if using the NTFS file system	Automatic	Automatic	Manual
Both	Distributed transaction co-ordinator	Co-ordinates transactions distributed on multiple computers	Manual	Manual	No change
Both	DNS client	Required for DNS name resolution	Automatic	Automatic	Manual
Both	(Windows) Error reporting service	Allows creation and transmission of error reports	Automatic	Automatic	Disabled
Both	(Windows) Event log	Displays events such as device messages or errors	Automatic	Automatic	No change
XP	Help and support	Activates the Windows Help and Support Center	Automatic	N/A	Manual
XP	HTTP SSL	Service for implementing secure connections via HTTP	Manual	N/A	No change
XP	IPsec services	Manages IP security directives	Automatic	N/A	Manual
Vista	IPsec policy agent	Manages IP security directives	N/A	Automatic	Manual
XP	Logical disk manager	Recognises and monitors hard disk drives	Automatic	N/A	No change
XP	Messenger	Transmits network management and alert messages	Disabled	N/A	No change
XP	MS software shadow copy provider	Manages volume shadow copies that let backups be made in the background	Manual	N/A	No change
Both	Net logon	Processes account registration for computers on a domain	Manual	Manual	No change
XP	Netmeeting remote desktop sharing	Needed for remote desktop sharing	Manual	N/A	Disabled
XP	Network DDE service	For programs that swap data over the network using dynamic data exchange	Disabled	N/A	No change
XP	Network DDE DSDM	Controls dynamic data exchange between computers	Disabled	N/A	No change
Both	Network connections	Manages network and remote data exchange connections	Manual	Manual	No change
XP	Network provisioning service	Manages network configuration files	Manual	N/A	No change
Both	NLA (Network location awareness)	Stores network and location information	Manual	Automatic	Manual
XP	NT LM security support	Security functions related to the RPC	Manual	N/A	No change
Both	Print spooler	Loads print jobs into Ram	Automatic	Automatic	No change
XP	Portable media serial number server	DRM serial number management tool	Manual	N/A	No change
XP	Plug & play	Automatic recognition of hardware changes	Automatic	n/a	No change
Both	Protected storage	Sets up secure storage for private keys	Automatic	Manual	No change
XP	QoS RSVP	Ensures Quality of Service, for example predetermined event durations	Manual	N/A	No change
Vista	Superfetch	Monitors activity with the aim of improving performance	N/A	Automatic	No change
Vista	Tablet PC input	Enables Tablet PC pen and ink functionality	N/A	Automatic	Disabled
Vista	Windows Defender	Protection from spyware and viruses	N/A	Automatic	No change
Vista	Windows updates	Enables detection, download and installation of Windows updates	N/A	Automatic	No change

Key: Row colour shows recommended start type

Definitely turn off
 Definitely turn on
 Turn on as ease-of-use feature
 Can be turned off after checking dependencies
 Not critical

Libraries (DLLs) have been loaded. It's perhaps overkill most of the time, but Process Explorer can be invaluable when troubleshooting rogue processes.

Windows services

A quick glance at the Windows Taskbar will tell you which software applications are making use of system resources. What's not

so obvious is the number of services running, many of which are set to automatically load when you switch on your PC.

Services are programs that run in the background, performing vital tasks such as facilitating network connections and scanning for Windows updates. Many third-party applications will install their own services. A service can be in one of three

states: started (active and running), stopped (not active and will only be restarted when your PC is rebooted) and paused (suspended, but can be resumed at any time).

Whether a service loads at boot depends on its Startup Type, of which there are also three: Automatic (loads as soon as you boot Windows), Manual (must be specifically activated by a user or application) and

Disabled (won't run and is effectively ignored). Vista gets the additional Startup Type of 'Automatic - (delayed start)', which means the service will start automatically, but slightly after the services with the standard Automatic Startup Type.

Before you start changing any settings, remember that many services are essential to the smooth running of Windows. Unless you're sure what the function of a service or application is, it's best to leave it alone. Our table on the previous page lists the most common Windows services, together with our recommendations for Startup Type.

MSconfig

MSConfig is a tool that comes as standard with XP and Vista, and is commonly used to alter which programs and services are loaded when you boot into Windows. To run MSConfig in XP, click Start, then Run and type 'msconfig'; in Vista, type 'msconfig' into the Search bar on the Start menu.

The Startup tab lists all applications that load as soon as you boot into Windows; you can then disable individual entries by removing the tick from the box to the left of each program. You can also view all services (both Windows services and those created by third-party software) under the appropriately named Services tab.

Although useful as a quick reference, if you want to change which programs, services and other items run at startup, we'd recommend using an application called Autoruns, which provides more information.

Autoruns

Like Process Explorer, Autoruns is a free XP and Vista tool developed by Sysinternals, and can be downloaded from www.tinyurl.com/5q9od9. The beauty of Autoruns is that it shows you absolutely everything that's loaded at startup, including services, drivers, applications and more. Using the tabs, you can view items in individual segments, or you can view all entries in one list under the Everything tab.

Each entry details the publisher name along with a brief description of what its function is. If you're still not sure what an entry relates to, right-click it, select Search Online and a browser window will appear complete with web search results relating to that specific entry.

If you've installed Apple iTunes, for example, you'll see a service called Apple Mobile Device that has a Startup Type of Automatic. However, if you don't have an iPod or other Apple-based portable media player, this service isn't required. To find out a little more about the service, right-click it

You can change a service's Startup Type using Windows' Services tool

Turn back time with disk imaging

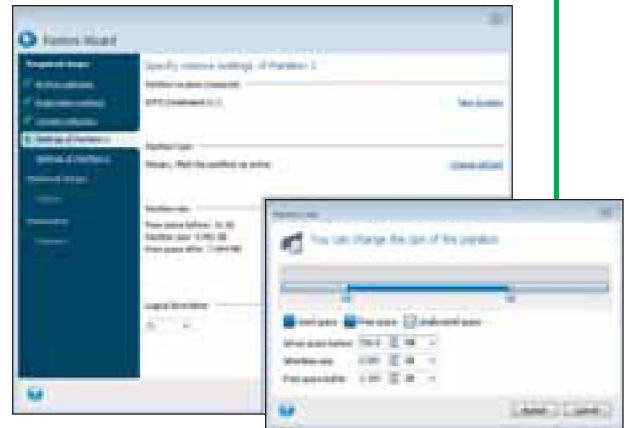
There will always be times when the only way to restore your PC to its former glory is to bite the bullet and reinstall Windows.

This process, however, creates its own problems, not least that you'll have to also reinstall all your applications.

If you do decide to reinstall Windows, or have just bought a new PC, it's worth investing in some disk-imaging software. Imaging is the process of creating a snapshot of your hard disk, enabling you to return your PC to that precise state. It's best to create the image after you've installed all your essential software, so when you re-image your hard disk you'll have everything up and running.

Acronis True Image (£39.95, www.acronis.co.uk) is a popular application that's both easy to use and feature

Imaging software can be used to return to a clean OS install



rich. As well as creating images of entire disks, it can be used to clone disks and back up files to an FTP site. A free trial is available from Acronis' website.

Those of you with Windows Vista Home Premium or Ultimate have a disk-imaging tool built-in – the Windows Complete System Backup creates an image file that you can restore by booting your PC from the original Vista installation DVD.

and select Search Online. Now right-click the service and select the Process Explorer option. The Process Explorer utility will load and you'll be taken to the Apple Mobile Device properties window. Under Physical Memory, the WS Private entry (this details how much memory the service is hogging) shows it's only using 872KB, but if you want to squeeze every last bit of performance out of your PC it's worth turning it off.

You can disable the service in Autoruns by removing the tick from the box next to it, or return the Windows' Services utility, double-click the Apple Mobile Device entry and change the Startup Type to Disabled. If you subsequently invest in an iPod, you'll need to return this setting to Automatic.

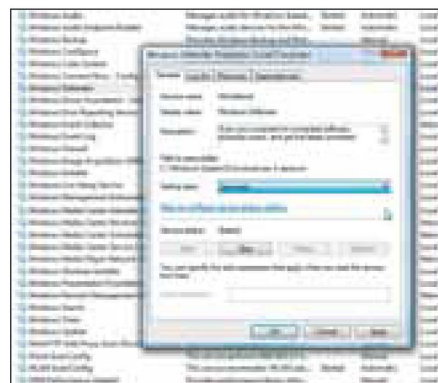
Since it's designed to highlight those items that are run as soon as you boot into Windows, it won't display those services that have Startup Type of Manual, even if they're

running. To view all services, you'll need to use the Windows Services utility, which is accessible under Administrative Tools within Control Panel. Each service is listed, along with its Startup Type, status and a brief description. By right-clicking a service you can change its status and, by selecting Properties (or double-clicking an entry), change its Startup Type.

Knowing which services can safely have their Startup Type altered isn't always easy, and if you're not sure about one it's best to simply leave it alone. Most Microsoft services are best left to their default setting but, as you'll see in our table on the previous page, there are those that can be adjusted.

Boost for free

As we've shown, there are all manner of ways to get Windows running faster and more reliably. If you want a quick-fix solution there are plenty of applications to help you out, but by performing tasks such as hunting down and disabling unnecessary services it's possible to make significant improvements in next to no time and without having to purchase any additional software. Plus, you'll find many of the free applications mentioned above included in the Resources section of this month's cover DVD, with a smaller selection available on the CD edition of PCW. Alternatively, most of the programs – including trials of the commercial applications – can be found on the PCW Downloads site at www.pcw.co.uk/downloads. PCW



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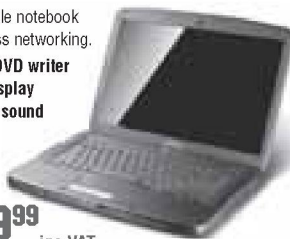
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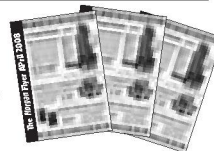
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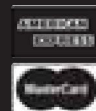
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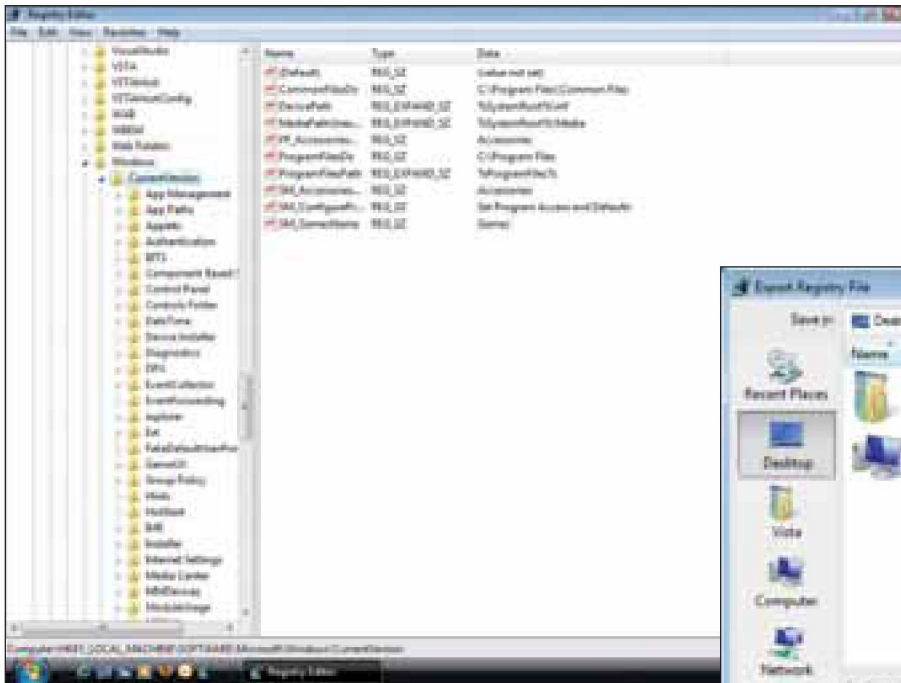
The Windows Registry is viewed with fear by many, but it's easy to work with once you understand the basics. Mark Wilson explains

When Windows is working well, the Registry shouldn't need touching and it's not a place where novices should need to tread. But there are occasions when Windows misbehaves in such a way that a manual edit of the Registry may be unavoidable. So to better understand your foe, read on.

The Registry as we currently know it was first introduced way back in Windows 95. Prior to this, those with long memories may remember the INI files used by Windows 3.1x (such as win.ini and system.ini) to store program and driver configuration information. Third-party developers could also use their own INI files for configuring applications, which could result in the files being scattered all over your hard drive.

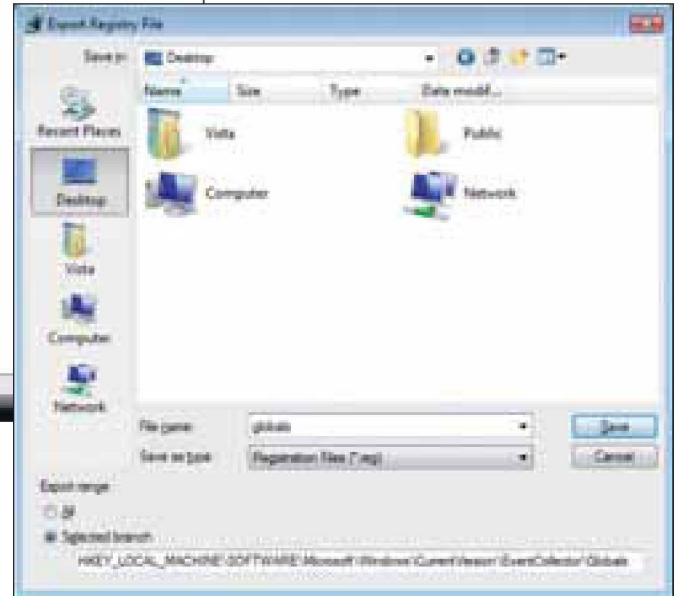
It's essentially a large database (stored in the /Windows/System32/config folder) used to store settings relating to Windows itself, along with any hardware and software that is installed. It's integral to the operation of Windows. When a change is made to settings using the Control Panel or a program's options or preferences screen, these changes are recorded in the Registry. As a result, there is often no reason to delve into the Registry – using Windows is a much easier way of adjusting settings. But by learning about how the Registry works, it is possible to take greater control of your computer and access otherwise hidden settings.

It is possible to work safely with the Registry. We will explain later how to back up the Registry itself – something that even novices might want to try, just in case the Registry ever gets corrupted.



Left: The Registry may look complex, but it is organised logically so you can locate entries easily

Below: You can back up selected Registry keys and branches by manually exporting them to .reg files, but to back up the entire Registry you need a separate utility such as Erunt



Hello, Regedit

To start working with the Registry, you can launch the Windows Registry Editor, Regedit, in several ways. In all cases you will need to be logged on with administrator privileges. In Vista, click Start, type **regedit** and select the entry from the list that is displayed. In XP, click Start, choose Run and type **regedit** in the dialogue box and click OK. Alternatively, in either operating system hold down the Windows key and tap R simultaneously before typing **regedit** and pressing Enter.

In Vista it may be necessary to click Continue at the User Account Control box, if this is displayed. Once the Registry Editor has loaded, the similarity to Windows Explorer should be immediately apparent. The various components of the Registry are displayed in a tree-like structure in the left-hand panel, much like Explorer's folder display, while additional content is displayed in the right-hand window.

Key to the Registry

The terminology surrounding the Registry can be confusing, so it's a good idea to familiarise yourself with a number of key terms before proceeding.

There are five main entries in the left-hand panel. These are referred to as hives and each is concerned with the storage of different types of settings. The HKEY_CLASSES_ROOT hive is mainly used to store information about file associations, and HKEY_CURRENT_USER holds the settings of the user currently logged in to Windows. HKEY_LOCAL_MACHINE is used to store information about installed hardware and software, and these settings are applied to all users, while HKEY_USERS comprises links to sections of HKEY_CURRENT_USER.

Very little information is stored in the latter and that which it does contain relates to the current system configuration, with information drawn from sub-sections of HKEY_LOCAL_MACHINE.

Expand one of the hives by clicking the plus sign alongside its name, and a series of folders is displayed – these are known as keys, which can contain further sub-keys. Icons appearing in the right-hand pane are known as values and these come in various types including String, Binary, DWORD and Expandable String.

The right-hand pane is split into three columns, the first of which, labelled Name, simply indicates what the value is called. The

Type column shows the type that has been assigned to a value, while the Data column shows the setting that has been applied to a value. Depending on the type of value the Data column may contain a path, a number, or a word. It is also possible for a value to have no setting – indicated by the presence of the words 'value not set'. This should not be interpreted to mean that the value is not needed, as the lack of data should be regarded as a setting in its own right. Software may check this Registry key and perform a particular way if the value has no



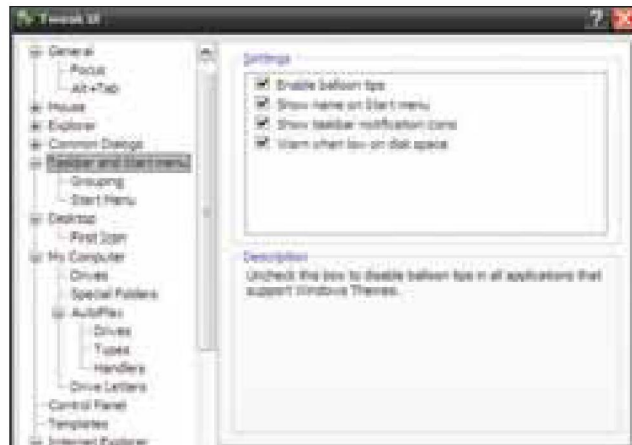
The Erunt utility will automatically back up your complete Registry every time Windows starts

Edit the Registry with tweaking software

If you use Windows 98 or XP, a handy tweaking tool called TweakUI is available. This utility makes it possible to change system settings that are otherwise only accessible by editing the Registry – something that not everyone is comfortable with. The program can be downloaded from the Microsoft website. Currently, there is no Microsoft-made Vista version, but there are alternatives.

One is Winbubble, a free utility that you can download from www.tinyurl.com/378hsc. It needs no installation: just extract the program from its ZIP file, open the resulting folder and double-click the file named Winbubbles.exe. Working through the various tabs, it is possible to perform a number of tweaks such as adding options to the context menu that appears when right-clicking on files and folders, customising icons for drives and folders and disabling Vista features such as Aero.

Another similar program is the free version of TweakUI (www.totalidea.com/product.php?Product=TweakUI). The free Basic version offers a limited range of Registry tweaks compared to the Pro and Premium versions.



TweakUI lets you safely modify a range of XP Registry settings and can be downloaded from Microsoft's website

data but perform differently if data has been assigned to it. It may also be the case that problems arise if the value is not found to be present.

How to back up

When editing the Registry it is vital that you are certain of any changes, additions or deletions you make. If you are unsure of anything, double-check and if in doubt, leave well alone. Registry editing is potentially dangerous, and it is easy to turn a working computer into an unusable mess with one false step. Before you implement planned changes, backing up all or part of the Registry is highly recommended. This can be achieved in a couple of ways.

The first option is to create a backup of a sub-key, safeguarding the data it contains. In the left-hand pane, right-click a sub-key (or an entire branch) and select the Export option from the context menu. In the dialogue box that appears, enter a meaningful name for the backup, ensure that Registration Files (*.reg) is selected from the 'Save as type' menu and then click OK. The backup file will be saved. If you click the 'All' checkbox in the Export Range section, the entire Registry will not be exported, but only

selected hives, so such a backup can't be used to totally restore a system. For a full backup that you can use for an emergency restore, we'd recommend the Erunt tool (see later).

If need be, such backups can be reinstated by right-clicking the .reg file created above and selecting the Merge option. Before using this as the sole method of backing up the Registry, it is important to note that when .reg files are merged back into the Registry,

'Registry editing can be dangerous and it is easy to make your PC unusable'

they will not necessarily undo all the changes that have been made to a key. Any data that has been deleted will be restored to its previous state, but anything that has been added since you saved the key will not be deleted.

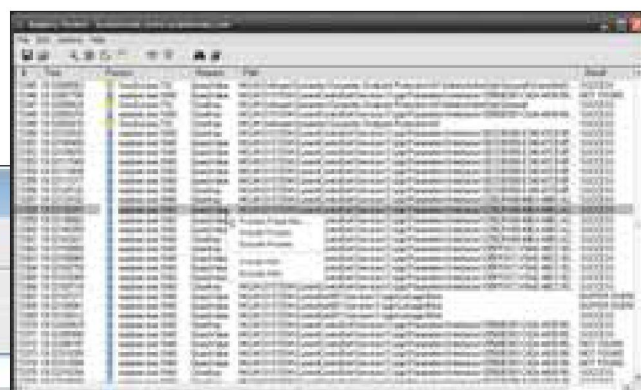
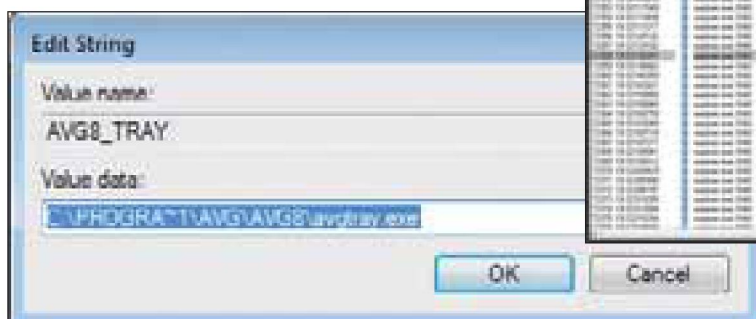
This is why it can be useful to back up hives in their entirety. To do so, right-click a key and select the Export option as mentioned before. This time, ensure that Registry Hive Files (*.*) is selected from the 'Save as type' menu. The

file that is generated does not have a file extension, but it can be reimported into the Registry to undo any changes. Unlike .reg files which can be merged with the Registry, hives must be imported from within the Registry Editor. Click the File menu and select the Import option. Select Registry Hive Files (*.*) from the dropdown menu and then navigate to and select the file that has been created before clicking Open. Click Yes to confirm the action and then OK once the operation is complete.

Backing up hives is by far the most secure means of backing up sections of the Registry because, when a backup is imported, all changes that have been made will be reversed. Additional information about how to create and restore a backup of the Registry can be found on the Microsoft website at www.tinyurl.com/bpov.

However, .reg files are not entirely redundant. If you have more than one computer running Windows Vista, for example, it is possible to make changes to the

It's easy to change the value of existing Registry keys, but for some tweaks you may need to create a new key first



The Registry is constantly changing, as Microsoft's free Registry monitor Regmon demonstrates

Registry on one machine, export the relevant keys and then copy the .reg file to another computer. The information stored in the file can then be imported into the second computer's Registry to save duplicate editing. You should only use this method when working with keys that relate directly to Windows itself though, as the hardware and software installed on different computers is unlikely to be the same, and irrelevant Registry keys could lead to problems.

A much easier way to back up and restore the Registry is to use the free Erunt tool (www.larshedderer.homepage.t-online.de/erunt). This handy tool backs up your entire Registry to a directory of your choice, and can also be

'The tweaks available by editing the Registry are virtually limitless'

set to automatically create a backup every time Windows starts. Erunt comes with a very useful text guide to backing up and restoring your Registry.

Finding your way

While navigating the Registry, it's easy to lose track of exactly where you are, not least because the highlight effect used to indicate which key is currently active can be difficult to see. But help is at hand in the form of the status bar. Just like Windows Explorer, the Registry Editor includes a small information panel at the bottom of the window which displays the address of the currently selected key. If this isn't visible, click the View menu and ensure that the Status Bar option is ticked.

Deleting unwanted keys and values is a simple matter of right-clicking the appropriate item and selecting the Delete option before confirming the action – renaming can be done in a similar fashion. To edit the data connected to a particular existing value, double-click it, make any required changes and click OK.

Should a Registry tweak require the creation of a new key, start by navigating to the key which will act as the parent and then click Edit, then New followed by Key before entering a name and pressing Enter. If a new value needs to be created, click Edit then New and select the type of value you want to create, before typing a name and pressing Enter. The value can then be assigned another value by double-clicking it and entering the required data.

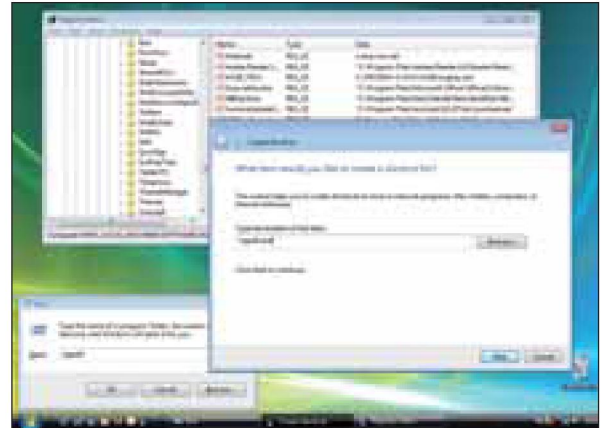
Advanced tweaks

This masterclass is intended as an introduction to working with the Registry, and there is not enough room to mention

Access and navigate the Registry easily

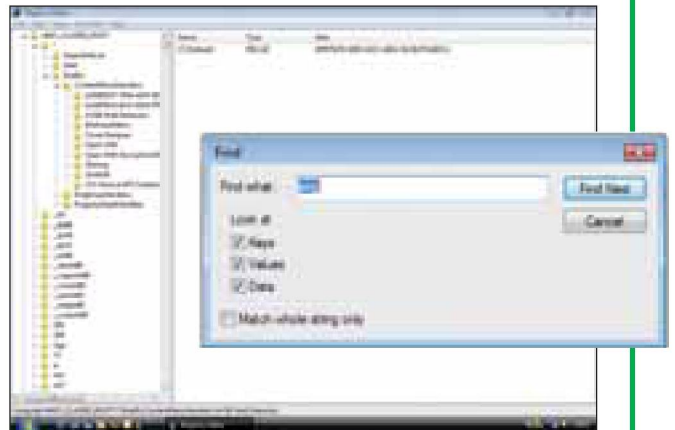
Step 1

Although the Registry can be launched from a Run box, frequent editing may justify creating a shortcut. Simply create a new shortcut pointing to regedit.exe on the Windows Desktop and then drag it to the Quick Launch bar or Start menu for easy access.



Step 2

Using the Registry Editor's search facility can make it easier to home in on references to a particular file or program. Click Edit, then Find, type a keyword and press Enter to go to the first instance of the word, using the F3 key to jump to the next.



Step 3

Frequently used locations in the Registry (such as the Run key) can be bookmarked for easier access. Navigate to the key in question before clicking Favorites, followed by Add to Favorites and then enter a suitable name. Use the Favorites menu like the one in a web browser to jump to these bookmarked locations.



individual tweaks that can be applied. However, to get you started, use the Registry Editor to look at HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Run and HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Run. Here you'll find a list of programs configured to run automatically when Windows starts – simply delete any that are not required for accelerated startup times.

This is a fairly safe tweak but, as we've stressed throughout, do back up the Registry first – there may be a startup program that, for example, your printer needs to work properly.

The tweaks and customisations that can be put in place by editing the Registry

are virtually limitless and plenty have been mentioned in the Hands On and Question Time sections of PCW over the years.

Find more tips on the web at Computer Performance (www.tinyurl.com/6fqajk), Blackviper (www.tinyurl.com/dz9hjm) and Winguides (www.tinyurl.com/2qzls1). But a final word of warning – don't try playing around with Registry tweaks just for the sake of it – you could end up spending more time fixing your mistakes than you bargained for.

Finally, for some more advanced topics specifically for XP users (although much of it is still relevant to those running Vista), you can read a PDF of our 2006 guide to the Registry at www.pcw.co.uk/2159389. PCW

Customise your Word Press



You don't need extensive design knowledge to make your blog stand out. Ken McMahon explains

Given that a blog is essentially a list of chronologically ordered posts, you might think the potential for creative flair was limited and it's fair to say that many blogs look the same as one another.

However, there are some blogs that do look amazingly different while some don't even look like blogs at all. Although these über-blogs may be created by design professionals and CSS geeks, an increasing number are published by bloggers with scant knowledge of design or coding.

The most recent release of Word Press, version 2.7, makes blog customisation easier than ever. There's a growing library of both free and paid-for themes which you can install and apply in minutes.

With a little knowledge of CSS you can individualise your blog, add a company logo, change the typography and colour scheme and even redesign the navigation.

If trendy themes and custom style sheets aren't for you, then you can still stand out from the crowd and make your

blog a better fit for your content by using the customisation features in the Administration panel and by adding widgets and plug-ins.

In this guide we look at some of the customisation options open to those who are hosting their own Word Press blog using software from www.wordpress.org. If your blog is hosted on wordpress.com, there is much less scope for customisation, so maybe now is the time to think about taking control and making the leap to self-hosting (see page 38).

Before making any changes to your blog it's always advisable to back up both your blog content and database. The excellent Word Press codex provides advice on how to do this at www.tinyurl.com/m388m.

Customising from the Dashboard

The first time you see your blog it will display using the default 'Kubrick' theme. This is a two-column layout with your posts on the left and widgets (see box on the next page) in a sidebar on the right.

The Appearance sub-panel on the admin panel provides some customisation options

that will take you a short distance away from the default theme and help you get your pages looking the way you want them. The Manage Themes sub-panel, which displays when you click Appearance in the main navigation menu, allows you to select from the available themes.

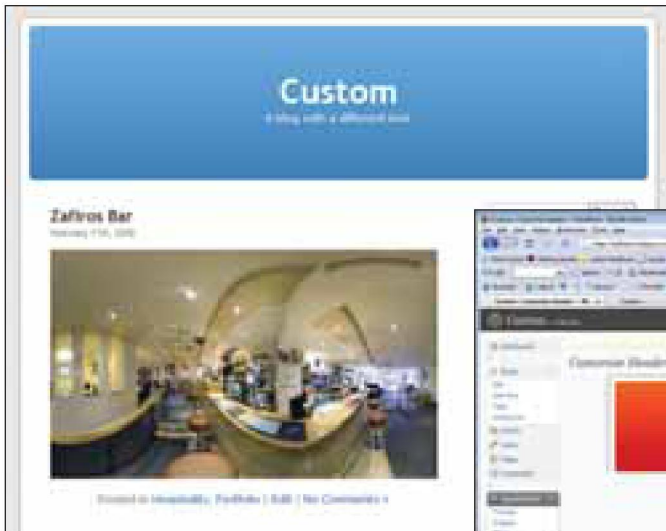
Editing the default theme

A white title on a round-cornered rectangle with a blue graduated fill announces to the world that your site is a Word Press blog. It's easy to change this – all you need to do is click Header Image and Colour in the Appearance panel and click the buttons to change the font and background colours.

If you want to radically alter the look of the header, you'll need to resort to some more advanced tinkering – see the section on customising CSS for more information.

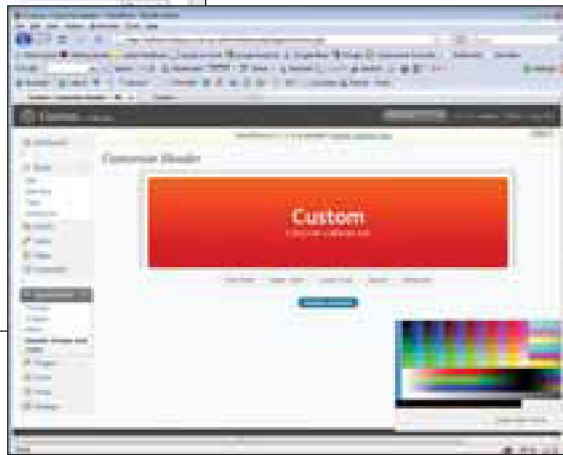
'Static' home page

With blogging you want your most recent posts displayed on the home page, as Word Press does. But what if you want a more



Left: The default Word Press header is a dead giveaway...

...but can easily be recoloured (below)



conventional looking home page that doesn't carry posts? One way to do this is to produce your home page using something other than Word Press, install Word Press in a sub-directory, for example /blog, and link to it from the home page.

Alternatively, you can easily set up Word Press to display one of your pages as the home page and define another page as your 'blog' page, displaying all your latest posts. This has the advantage of saving you the effort of designing your own home page, plus it will be consistent with your other pages in Word Press and be able to hold widgets and other content.

To do this, select 'Reading' from the Settings panel and opposite 'Front page displays' select the radio button labelled 'A static page'. Then use the pulldown menus to select which of your pages you want to be the new home and blog pages.

Plug-ins

You can find plug-ins either in the Word Press plug-in as already mentioned, or by selecting the plug-in browser from the Manage plug-ins page.

Most Word Press plug-ins are designed to add functionality to your blog – they make it easier to carry out administration tasks, or to display information in a format



You can add a photo and change the text size

that isn't otherwise available. Plug-ins that manage visitor statistics, filter spam, or enable visitors to rate your posts will set your blog apart from the crowd, but they won't do much to alter its visual appearance.

One solution is to install a plug-in that provides an alternative way to display images in your posts. Word Press includes Gallery shortcode that displays a thumbnail gallery of images attached to a post, but there are a variety of plug-ins that go much further with images.

One plug-in such as Lightbox provides about the coolest and most user-friendly way to display pictures and will instantly

set your blog head-and-shoulders above the rest.

There are several Lightbox plug-ins, but they all do much the same thing with minor variations, which is to overlay your images in a modal window on the page. The rest of the page is dimmed to highlight the image window which displays a full-sized image and can usually be closed by clicking anywhere on the page.

The more sophisticated Lightbox plug-ins will show an entire gallery as well as individual images and display captions.

If you want to see Lightbox plug-ins in action, take a look at any of the following examples:
www.4mj.it/lightbox-js-v20-wordpress
www.stimuli.ca/lightbox
www.tinyurl.com/cmzx7h

Graphics and CSS

Although you can customise the default theme header using the options in the Header Image and Colour sub-panel from the Appearance menu, by simply substituting the image used for the header you can achieve a much more radical customisation. The default theme header graphic is wp-content/themes/default/images/kubrickheader.jpg.

If you want a different header, simply replace this JPEG file with a different one of the same dimensions (760x200 pixels). First rename the old version kubrickheader_old.jpg.

Improve your design with a widget

Word Press widgets are add-ons that allow the addition of design elements and other content to your blog. The widgets displayed in the default theme include Your Pages, Archives, Categories, Blog roll (links) and Meta (admin and login).

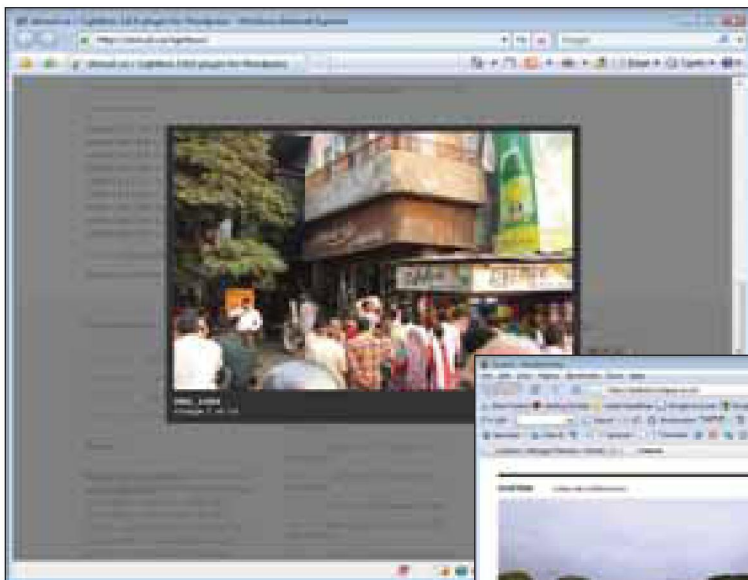
Clicking Widgets provides a display of all the available widgets in the left-hand column and current widgets on the right. Somewhat counter-intuitively, the current widgets column doesn't include the default widgets and explains that you are currently using 0 widgets. If you add a single widget it replaces the entire default selection, so if you want to keep any of the default widgets, you'll have to add them in again.

To insert a new widget you simply click 'Add' and it appears in the current widgets column. Some widgets have editing options. The Categories widget, for example, can be displayed as a dropdown list, arranged hierarchically and display post counts. The

Text widget obviously has a field for entering text, and all have a remove button.

Though perhaps not the most exciting widget in the box, the Text widget comes in handy for adding important messages to all your blog pages; things like a short 'about me' message, contact details, or both. You can add multiple copies of any widget to the sidebar. However, this widget isn't just for text; you can also add images and Youtube videos. For a list of text widget-compatible content see http://codex.wordpress.org/Plugins/WordPress_widgets.

Among the more useful widgets included in the default Word Press setup are Search, Calendar, Tag Cloud, Recent Posts and Recent Comments, but you can extend the scope of your blog way beyond what's available in the default setup by adding third-party widgets. The first place to look for these is the Word Press plug-in directory at www.wordpress.org/extend/plugins.



Left: Light box – the coolest way to display your blog pics

Below A makeover with a theme from graphpaper press.com



Bear in mind that the original header image has a border that joins the rest of the page, so you might want to use this as a template to paste your new image into.

If you want to use a photo for your header, but haven't got anything suitable, take a look at www.redalt.com/tools/kubrikr. Kubrickr is a tool that helps you search Flickr for a suitable Creative Commons licensed photo for your blogs, crops it to the correct dimensions, adds the border and saves it to your hard drive. Take a look inside `wp-content/themes/default/images` and you'll find other page elements that you can replace to create your own custom theme.

If you know a little CSS, you can go even further with customisation, altering the look and positioning of text and other elements on your blog pages.

The stylesheet for the default theme is `wp-content/themes/default/styles.css`. You can edit this in a web development application such as Dreamweaver, any text editor, or using the built-in Word Press editor (select Editor from the Appearance panel then select stylesheet (styles.css) in the right-hand column under 'Styles').

The first section controls the typography and colours.

/* BEGIN TYPOGRAPHY AND COLOURS */

How much you're able to do with this will clearly depend on the depth of your CSS knowledge, but here's a simple example. Scroll down to the following line:

```
H1 {
    FONT-SIZE: 4EM;
    TEXT-ALIGN: CENTER;
}
```

This sets the font size of any h1 element to 4ems. The only h1 text in the default theme is the blog title in the header panel at the top of your blog pages. If you change this part of the stylesheet as follows:

```
H1 {
    FONT-SIZE: 8EM;
    TEXT-ALIGN: CENTER;
}
```

You can increase the size of your header text at a stroke.

Changing the appearance and position of other elements can be equally straightforward, but the more CSS you learn, the more scope you'll have for really changing things.

Custom themes and frameworks

The quick route to radical Word Press makeovers is to apply a ready-made custom theme. There are literally hundreds of themes out there; the Word Press Theme

Directory at www.wordpress.org/extend/themes is the place to look. At the time of writing all 596 themes here were free. There's also a market for so-called premium or paid-for Word Press themes. These range in price and quality, and start from a few pounds.

Developers that produce paid-for themes often also offer a free version that omits some of the features of the premium theme and are often almost as good.

Remember that one of the drawbacks with customising themes is when you upgrade your Word Press installation, if the theme requires upgrading as well you lose all your customisation when the theme files are overwritten. To get around this issue theme developers are starting to produce theme frameworks.

The framework contains all the necessary PHP and CSS files and any amendments to it are made to a 'child' theme. The framework structure maintains all the customisation securely in the child theme which is not touched during any upgrade, effectively future-proofing your blog customisations.

Word Press theme developers that use frameworks include Thad Allender (www.graphpaperpress.com), Justin Tadlock (www.themehybrid.com/themes/hybrid) and Ian Stewart (www.themeshaper.com). PCW

Hosting your own Word Press blog

To run your own Word Press blog you'll need a server that supports My SQL and PHP. For most people that means it will be a Linux server running the Apache web server. Before you arrange hosting, check with your ISP that it can support this.

Setting up Word Press is pretty straightforward, Word Press prides itself on its 'Famous Five Minute Installation' which is described at www.tinypurl.com/hlnkm.

In a nutshell, the procedure involves downloading the Word Press files uploading them via FTP to your server, editing a config file, and creating the database. Unless you're a dab hand at working with MySQL from the command line, you'll probably find

it helpful to install php My Admin (www.phpmyadmin.net). This makes it much easier for those with minimal database experience to set up and manage a MySQL database.

If none of this makes much sense to you, don't be put off. The Word Press documentation or 'Codex' (www.tinypurl.com/z3djr) is extremely well written and informative and the forums at www.wordpress.org/support are another good source of help and advice.

If it all looks too technically challenging, you could try the Word Press free installation service at www.install4free.wordpress.net. At the time of writing the service had been temporarily suspended due to high demand, but may be back online by the time you read this.



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Better sound on the move

You don't have to have mediocre audio on your laptop or netbook. A few additions and changes can improve your listening experience greatly. Matthew Moore explains

The PC's heritage isn't in audio. Think about how audio is used on a PC: it's for system events and alerts. The PC's ancestry isn't wired for sound, and who hasn't winced at a low bit-rate MP3 played on low-quality speakers through a basic soundcard? The electrically noisy environment and all those other functions competing for precious PC resources meant audio was often the poor relation. Thank goodness the days of selecting IRQs to make your soundcard work are long gone.

Streaming audio has also changed the PC audio landscape. It has brought a huge increase in the choice and availability of audio, but low quality and interruptions have meant that we've often grown willing to accept low-quality audio as the trade-off for the speed and ease of access from Youtube and the major streaming services.

The good news for audiophiles is that you no longer have to live with mediocre audio. With PCs at the heart of so many home entertainment and gaming systems, there's been a heartening increase in choice and quality. Whether you're buying a new system

or want to upgrade your current laptop, desktop or netbook, there's a choice of hardware and software out there that means you're not stuck with the basics and can turn up the volume on PC audio with confidence.

Desktop PCs are often at least reasonably kitted out for audio, so we'll be concentrating on how you can really get to grips with audio on your mobile laptop and netbook, and how to get the best possible input; how to manage and manipulate audio on your PC; and how to play back sound so you can really enjoy it.

You can get some great audio results out of your laptop or netbook. What you can do is largely affected by the hardware limitations of your laptop or netbook. You can't avoid the physical limitations of laptop and notebook speakers; slower processors and limited battery life will also place some restrictions on what you can do. Moreover, professional audio software and netbooks don't make good partners.

Buying a new laptop

At the heart of a capture and playback system must be a PC capable of keeping up with audio input. If you're buying a new

laptop, check it has a chipset capable of supporting what you want to do. For example, the Realtek ALC889 chipset offers a good choice of inputs, including impressive microphone support. The best features are support for HD audio and Blu-ray, a good analogue differential CD input, and digital interfaces such as primary and secondary S/PDIF, though you'll need to check with your notebook manufacturer about the connectors provided.

If you're in the market for a new all-round system that's strong on home entertainment, you'll need a system capable of keeping up with the demands. We recommend at least a 2GHz CPU; at least 1GB Ram and a fast hard disk with quick access times. The HP Pavilion dv7-1000 that costs £899 and the Asus N80Vc that costs £632.50 (see www.pcw.co.uk/2235889), are two good general-purpose systems with a good set of interfaces for connecting audio kit. If you're buying a laptop to work with sound, for live performance, composing or recording, look at a digital audio workstation (DAW) from a supplier that specialises in audio systems. A high-end Apple Macbook

is worth serious consideration, too. The key to buying the right system is getting the right interfaces for your needs. As well as the basic 3.5mm connectors, it's worth getting a system with the maximum number of USB2 interfaces, Firewire, Express Card, S/PDIF and HDMI if you have a compatible home entertainment system.

Desktops and laptops also come with basic audio input. The standard 3.5mm line-in and microphone connectors can record voice, and will even stretch to recording a single stereo track or alternatively two mono signals; for example from a mono microphone and an acoustic guitar. The microphone and line-in connectors operate at different signal strengths. The microphone jack works better with lower signal levels, while the line-out will power PC speakers, your hi-fi amp or other analogue audio equipment.

S/PDIF (Sony/Philips Digital Interconnect Format or Sony Philips Digital Interface) is the easiest way to connect a compatible CD or DVD player, or home theatre equipment to your PC. S/PDIF (often labelled digital out) can be implemented as an optical link that is ideal for shorter distances and will avoid RF interference and ground loops. If you get a ground loop, which produces a buzzing hum through your speakers, make sure your equipment is properly earthed, and consider buying a special transformer. For distances over 6m between your home theatre and PC, choose coaxial S/PDIF, which has a lesser signal attenuation, and buy a converter if you have coax S/PDIF at one end and optical at the other.

External soundcards

Many of these interfaces are duplicated on external soundcards, so why should you upgrade? Well, you should get better sound quality. It's easy to find an external soundcard with a better chipset and isolating the audio hardware from the electromagnetic noise is a good thing. Many external soundcards are portable enough to be part of a mobile system and you'll be able to connect more audio equipment using a wider range of interfaces. The breakout box makes it easy to access, too.

Consider what you want to do before buying. Do you simply want to record speech – or audio from pre-recorded sources? If so, will you stick to hi-fi audio-only sources such as DVDs, CDs and turntables? Do you want to make your PC part of your home audio setup? Or do you want to make and perform your own music on your laptop? See the table on the next page to get an idea of what you want to do, what you'll need and what it'll cost.

The Audacity audio editor can capture voice input and edit MP3s, and add fade effects on tracks



The in-ear Sennheiser CX-300s are great-quality, cheap and suitable replacements for iPod phones

The choice is huge. For £19.99 (£16.99 on Amazon with free delivery) you can pick up the very compact Terratec USB2 Aureon dual USB. This offers a stereo digital out with an optical converter and microphone, which is useful if you want to add or improve the audio function on your laptop or netbook. It can also add a little audio spice to working life; just plug it in to play music on corporate PCs that have the sound disabled. Look at the M-Audio Transit (priced at £59) for better 24-bit, 96KHz recording from external sources and line/headphone output.

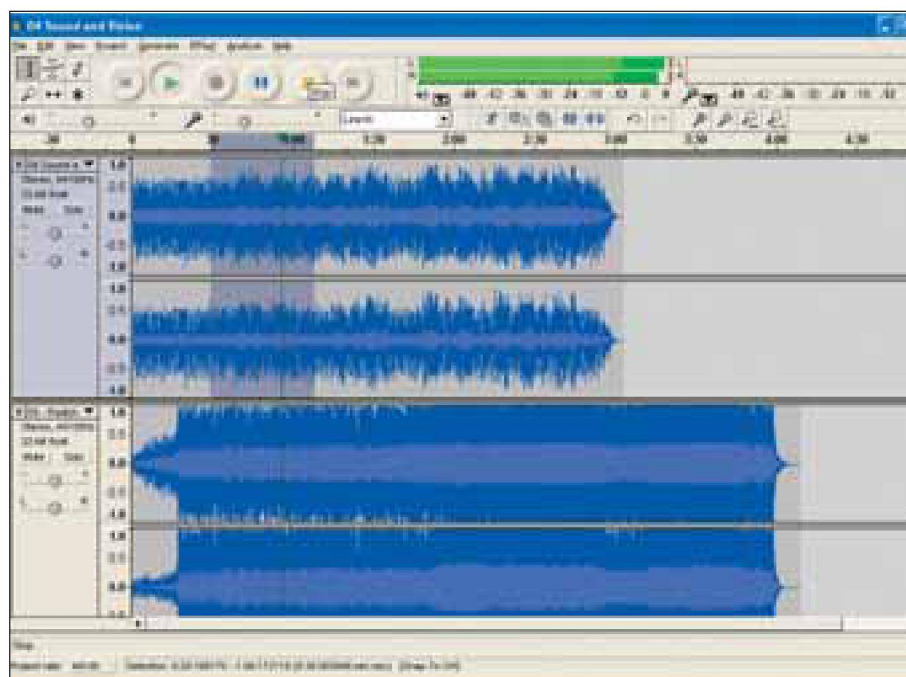
One step up and you'll find products designed for gaming and home entertainment, such as the Sweex External Sound Card 5.1 (£16.66 online) or the Trust Sound Expert 510EX USB 5.1 (from less than £25 online), which offers the basic interfaces via a better chipset. The 5.1 surround-sound support means you can connect a set of

home entertainment speakers for audio playback. Express Card products such as the Creative Soundblaster X-Fi Notebook Wireless (£61) are more portable. For a really portable, high-quality external soundcard, with the ASIO drivers needed for many software applications, the Edirol UA-1EX at £59.99 is hard to beat.

Along with Edirol, specialist audio companies such as M-Audio, Edirol, Motu and Lexicon produce the best products in this area. Higher prices are usually affected by the type and number of interfaces, analogue or digital Midi, better processors and chipsets, and professional features such as direct hardware monitoring and low latency.

Good ranges are available – M-Audio's starts at the lower end with the Mobilepre USB for £119. With two onboard microphone/instrument preamps, it's suited to field recording, sampling and voice recording. The Lexicon Lambda USB Desktop Studio (£129 from Dolphin Music) is a similar product, which is less portable, but includes a Midi interface and a nice software bundle. Both have good-quality microphone inputs to add a touch of class if you're making your own podcasts. If you'd rather use Firewire instead of USB2 though have a look at the Motu Ultralite-mk3. At around £500 it offers two microphone/instrument inputs, six line-level analogue inputs, 10 analogue outputs and S/PDIF in a very hard-wearing case.

Once you've set a budget and decided what kind of audio you want to capture and what you want to connect, go to www.avforums.com. You'll find useful discussions there on features, product capabilities and people's experiences.



What is the best equipment for you?

WHAT YOU'RE DOING	EQUIPMENT	COST (APPROX)
Recording voice Recording podcasts Ability to record and save audio and basic encoding Stereo output via PC or laptop speakers	Travel headset Compact USB soundcard (optional) Speakers (optional) Freeware sound editor	From £15 for headset only to £50 including options
Handling audio from your PC, hi-fi separates, DVD and home cinema systems Saving audio on your PC in different formats	External soundcard Mid-range headphones Microphone Speakers (existing/optional) Freeware sound editor and encoder Podcasting application (optional)	From £150 without options
Recording high-quality audio from microphones, musical instruments Creating and performing digital music	Digital audio workstation Professional audio interface, additional audio hardware, professional software	At least £1,000 for a high-quality, new setup

With your hardware installed, you'll need something to complement the improvements. From the unspeakable quality on a netbook – even the higher-end Samsung NC10 (£438.15 from Samsung's website) left us wincing – to the barely passable Asus N80Vc's capabilities, the problem is the physical form of the notebook. The speakers aren't large enough to deliver a good resonant bass. Lower frequencies have to travel through cones that are too small to deal with them, and you're probably all too familiar with the resulting tinny sound.

Stereo is poorly handled too. The speakers aren't far enough apart or correctly positioned to give you a sense of stereo space. External laptop speakers aren't much better. The Edifier MP300 (£49.99) comes in a carry case about the same size as a laptop and, while the novel subwoofer tube packed a punch at the lower end, it suffered the reverse problem from onboard speakers with too much top and mid-range pushed through the subwoofer, making speech muffled and wallowy.

Headphones are a better investment. We'd recommend two styles for mobile-audio use. A good pair of in-ear phones such as the iPod replacement Sennheiser CX-300 (from about £16.99) or the high-end Ultimate Ears super.fi 5 (from about £90), are great for portability and sound quality, whether you're listening to voice or music, and they have a physically baffling in-ear design. Wireless headsets are also improving and Altec Lansing's Backbeat 903 and 906 (shipping late February 2009) are worth a listen if you want to leave the wires behind.

If you're working with recording instruments or performing, you'll need a more powerful set of over-the-ear phones such as the Sennheiser HD 205 (from over £20) or a similar product. The closed-back design shields you from loud ambient sound so you can hear what's coming through. A gaming headset with a good-quality integrated microphone can make laptop or netbook podcasting a pleasure. Just plug them in to the line-in or USB, and you can record and play back simply and easily, leaving your hands free to operate your recording or podcasting software.

Softly, softly

With your hardware set up and correctly installed, the next step is to choose and use the right software for the job. After ensuring that microphones are correctly set up and enabled in Windows, you can use a good audio editor to get the results you want. We used the Audacity audio editor (free) to capture voice input and edit MP3s, including fading in and out of tracks, and were impressed by the fast editing of large files. Audacity doesn't limit the number of tracks you can edit and mix.

We also liked the laptop and netbook-friendly touches, such as the option to turn off the graphic-level meter to improve performance if you have an older, slower laptop or want to boost performance if you're running multiple applications. Easy integration with the Lame MP3 encoder



Above: Edifier MP300 speakers are specially designed for laptops



Left: To record from external sources the M-audio Transit is ideal

makes producing audio files for podcasts or other applications very easy. If you're an experienced podcaster and want a nice bundle, the M-Audio Podcast Factory includes a microphone, desktop stand and software from £84.49.

More specialised software is available for those more serious about making music. Sony Sound Forge (from £227.64) is a semi-professional audio editor that offers stereo and multichannel recording, sample level editing and some impressive effects.

Audio-for-video is included among the extras – unavailable with free products such as Audacity. This allows you to make and synchronise soundtracks, and export to AC surround-sound 3 format. For performing live and creating music, you will need packages such as Ableton Live 7 (from £110 online) to give you a true recording studio on your laptop.

Now you should have a good idea what upgrades are available. And there's so much flexibility, you can select exactly what you need to get brilliant results and ensure your home studio sounds how you want it to. **PCW**



M-Audio's Mobilepre USB external soundcard is ideal for recording



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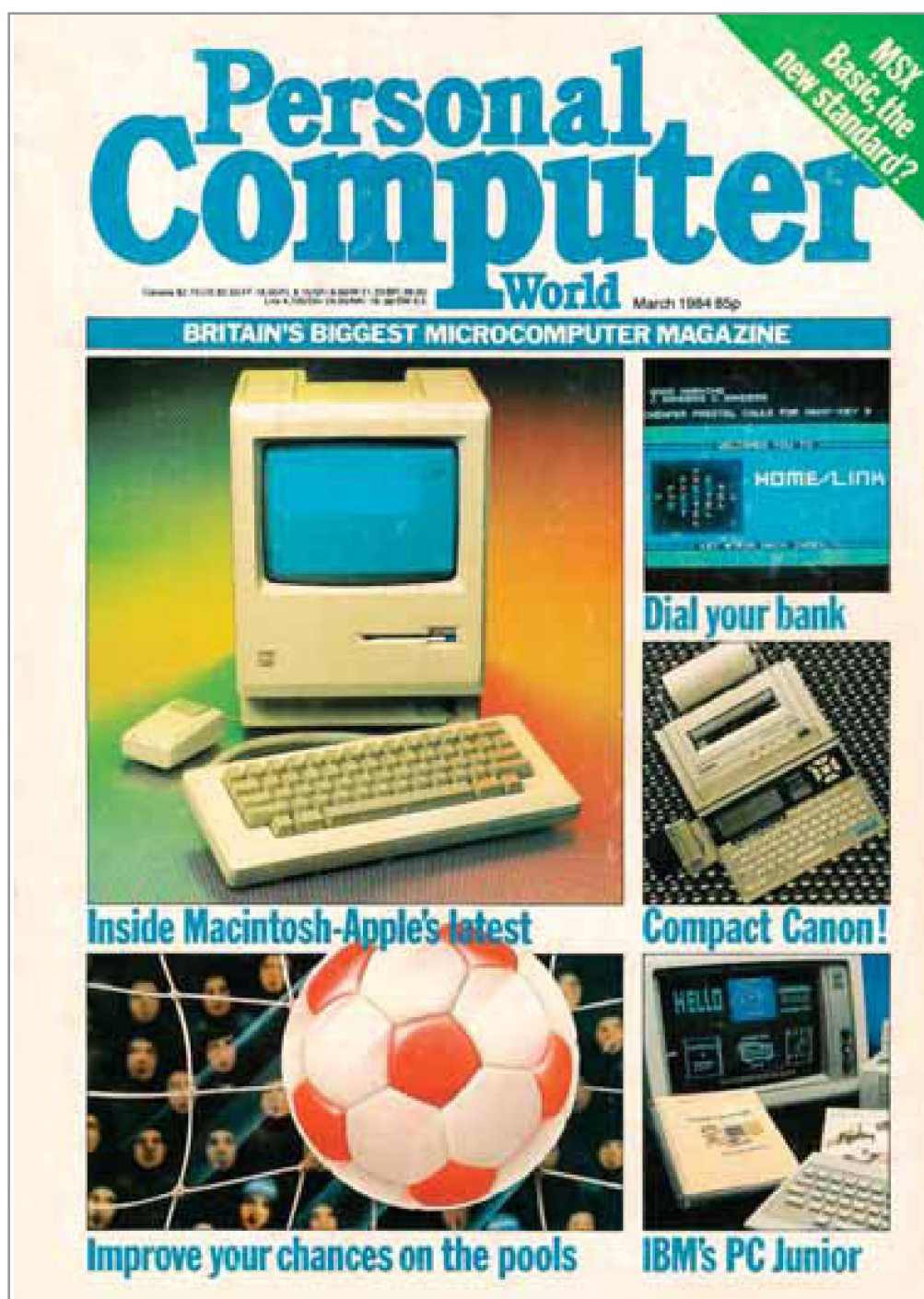
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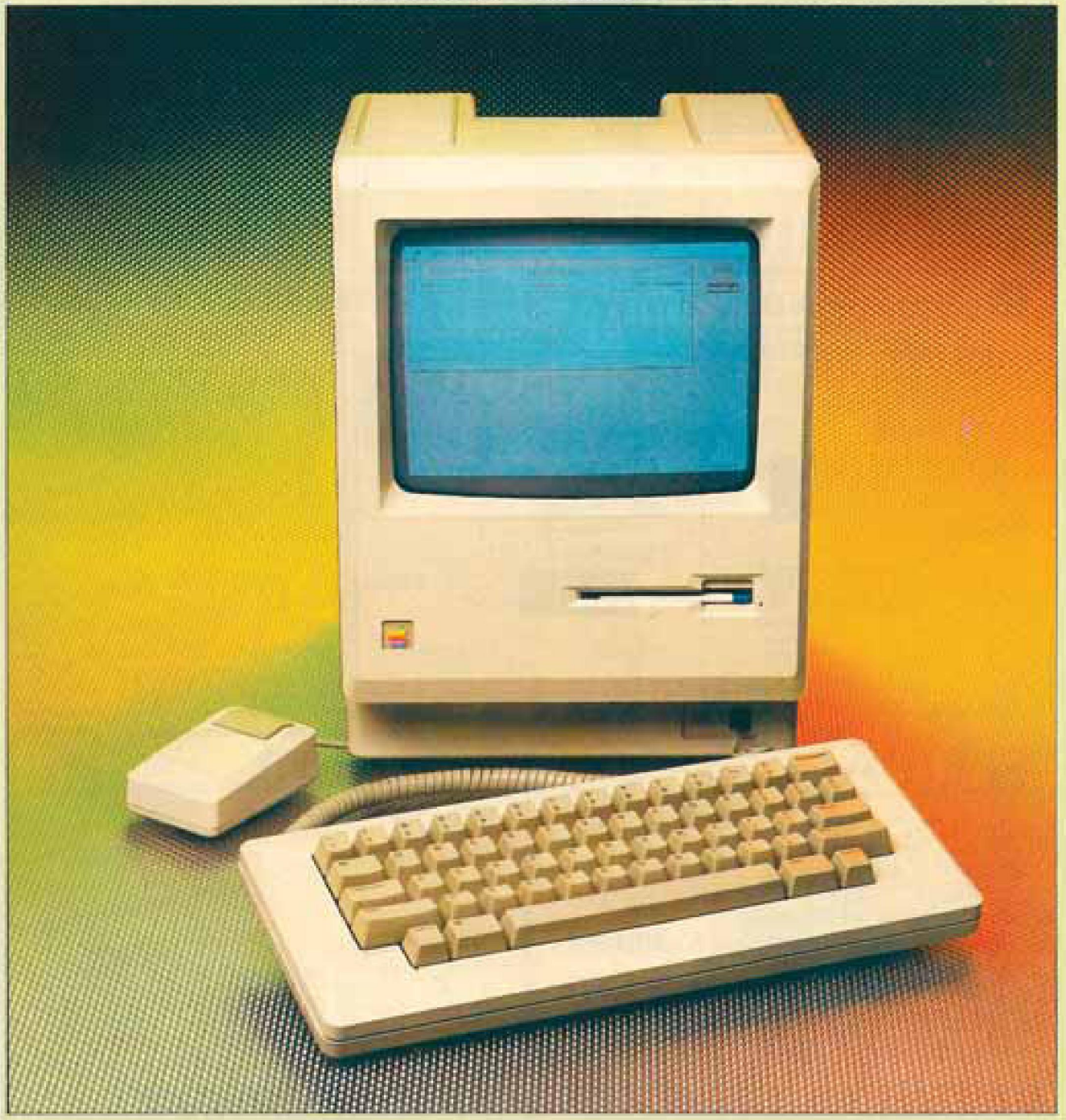
In the second of our Retro series, we celebrate the 25th anniversary of the ground-breaking Apple Macintosh. In March 1984 PCW compared the newly launched Mac to its older sister Lisa to see what improvements had been made. We also asked if Apple could really take on the might of IBM, its Personal Computer and the MS-Dos operating system



B E N C H T E S T

Macintosh

Perhaps it's too early to speculate but many people see the Apple Macintosh as the machine that will succeed in drawing users away from the IBM 'safety net'. Our West Coast contributors, Robin Webster and Leslie Miner, put this compact but powerful computer through its paces while closely comparing it to its big sister, the sophisticated Lisa.



BENCHTEST

Many years ago, a group of researchers at the Xerox Palo Alto Research Centre (Xerox PARC) developed the concept of a small notebook-sized computer capable of showing high resolution graphics on its small flat-screen display. This futuristic machine was named Dynabook.

Today, Xerox is no closer to developing the Dynabook. Instead, Apple Computer has taken the first few steps towards making that particular vision a reality.

With the development of its Lisa office computer system (see the Benchtest, PCW, July, 1983), Apple drew upon and enhanced much of the work already carried out by Xerox workers.

Indeed, Apple's new computer, the Macintosh, makes comparisons with the original idea interesting.

The machine is compact, but powerful, and modelled on the Lisa concept—it's described as being part of the Lisa family, or as using Lisa 32-bit technology. Its major features are a transportable system unit including high resolution black and white display, one microfloppy disk drive, 128k of main memory and a mouse.

In contrast to early rumours about the Macintosh, it's not a watered-down version of the Lisa. It does feature a high resolution black and white display that can show visual representations of files (known as icons); it does feature a mouse; and it does offer many of the software possibilities of the Lisa.

Probably the biggest surprise is that the Macintosh is totally incompatible with the IBM Personal Computer; moreover, it doesn't even run stripped down, revised or enhanced versions of Microsoft's MS-DOS operating system. The surprise comes to many who see Apple's whole future on the brink, due to IBM's inroads into Apple's market share. Instead, the Macintosh uses its own proprietary operating system called the Finder which operates in much the same way as the Lisa's Desktop Manager.

Another surprise is Apple's decision to standardise on the 3.5in microfloppy disk for the Macintosh. A basic Macintosh comes with one built-in microfloppy drive capable of storing up to 400k, although another external drive can be added for \$395.

In the United States, the suspense over the Macintosh's appearance and what it would be able to do almost paralleled the fuss made over the IBM PC Junior. There is a significant difference, however. For most people, the PC Junior signals IBM's journey down into the depths of the home computer market (or at least the non-

professional computer market). For others, the Macintosh signals Apple's carefully planned attempt to provide computer users with a viable alternative to the MS-DOS software/IBM hardware duo, and to remain a billion dollar computer company. Although Apple denies it, some observers are saying, 'The Mac had better be good, or else the company may not survive...'

Since it's intended to be an educational as well as a professional machine, US universities were among the first organisations to see prototypes of the Macintosh. Some have already announced their intention to buy hundreds of them.

On the professional side, Apple says there are about 80 major software developers working on products for the Macintosh. These include standard MS-DOS or CP/M type software packages (which are being outwardly redesigned to make use of the Macintosh's icon-driven and mouse-controlled interface), and new products that will make the fullest use of the Macintosh's facilities.

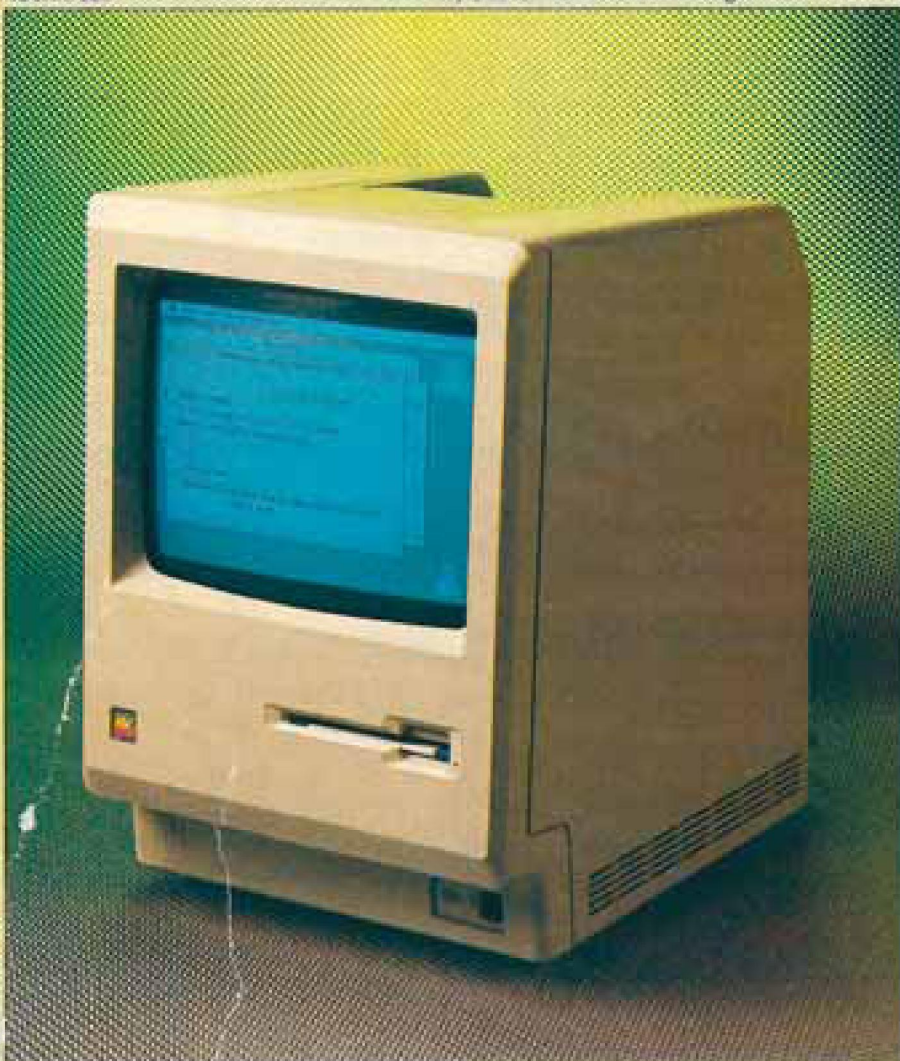
Hardware

According to one Apple researcher: 'The Apple II was designed in a garage to be built in a garage, whereas the Macintosh was designed to be built by robots.' Apple has therefore built an entirely automated factory in Fremont, California, to meet expected demand.

Rather than follow the conventional design of separate system unit, display and keyboard, the Macintosh has been designed more as an all-in-one product.

The one-piece, injection-moulded, plastic casing houses the 9in black and white display, the single microfloppy disk drive (developed by Sony), the main motherboard and the video circuitry. The only separate part is the keyboard. The Macintosh measures 13.5in high x 9.7in wide x 10.9in deep.

At the top rear of the beige casing there is a recessed area that allows the Macintosh to be picked up easily—not unlike the grip on a telephone. While the machine is fairly light—it weighs in at around 20lb including the mouse and



9in high resolution black and white display

BENCHTEST

the keyboard — it cannot really be described as portable. That compromise description 'transportable' fits much better. Rather than make the Macintosh a clip-together type of system where the keyboard fits over the display and the casing has a handle on it (like the Compaq or Kaypro computers), Apple has designed a special, padded carrying case complete with straps.

Since Apple intends the Macintosh to become a truly international computer, it has made sure that there's no writing, in any language, on the plastic casing (other than the signatures of the main designers which are moulded on the inside back of the case).

Along the back bottom edge of the casing are five built-in ports that allow the user to connect up various peripherals.

Like the user-interface, the Macintosh uses icons above each interface port to describe their purpose.

Going from rear left to rear right, there is the mouse connection, the external disk drive connector, a serial output port for connecting a modem, another serial port for connecting a printer, and a four-channel sound output connector (the Macintosh does have its own internal speaker, but the additional outlet could be useful for stereo output or if access to a high quality speaker system is available).

At the back of the Macintosh, there is an on-off switch set just above the mains power inlet and, above that, a battery storage area used to provide power to the built-in system clock.

A practical design feature of the Macintosh is a security bracket slot on the back which is used, with an optional

security kit, to secure the lightweight Macintosh to a desk.

Like its big sister, the Lisa, the Macintosh uses passive cooling. Vents at the bottom of the casing allow air to enter the machine's circuitry, where it's heated. This warm air then escapes from further vents placed at the top of the casing, on either side of the carrying handle.

When we viewed the system for the first time at Apple's headquarters in Cupertino, California, Steve Jobs, founder and head of the company, said that the Macintosh would be 'the fastest and most powerful computer ever placed in the hands of a large number of people'. Such a statement can, and will, be argued. But what is it about the Macintosh that prompted Jobs to make the claim in the first place?

The Macintosh is based on a Motorola 68000 microprocessor (referred to as a 32-bit chip although it handles data in 32-bit chunks internally and 16-bit chunks along input/output channels) operating at 8MHz. This is very fast for such a low-cost machine.

In comparison, the original Lisa system uses the same 68000 chip running at about 4MHz and the so-called 16-bit IBM Personal Computer uses an Intel 8088 (16-bit internal and 8-bit I/O transfers) running at 4.77MHz.

The Macintosh's faster processor speed is noticeable when intensive work with the various graphics options is in progress.

The 68000 chip sits on a single large board at the bottom of the machine's casing. The five built-in ports extend out of the motherboard's back edge. As well as the 68000 chip, the board holds a 64k ROM, the graphics processor, 128k

of RAM memory and a number of other important devices. Semiconductor products have been obtained from manufacturers such as Zilog, Hitachi, Texas Instruments, and Motorola.

The major criticism of the Macintosh is that it has only 128k of memory. Many people will feel that if Apple is trying to make it the new alternative to the IBM Personal Computer and its growing army of lookalikes, then it would probably have made a lot more sense to enter the market with a 256k Macintosh, instead of a 128k machine. After all, even the IBM PC Junior can be stretched to include 128k of main memory.

When asked about the decision to go ahead with a 128k Macintosh design, Steve Jobs responded: 'When the Apple II was launched it was supplied with 2k of ROM. The IBM Personal Computer has about 6k of ROM. The Macintosh has been supplied with 64k of code locked into ROM that is the most tightly written code I've ever seen. The 64k ROM contains a lot more than just the complete Macintosh operating system.'

The 64k ROM includes the operating system along with the necessary file system and device drivers (printers, displays, and so on) for handling I/O operations, and it includes a number of other software 'layers'.

One layer concerns itself with all the 'management' tasks such as memory management, mouse operations management and keyboard management.

A second software layer contains about 35k of code which is referred to as Quickdraw. Quickdraw is exactly the same program as is used on the Lisa system to handle graphics-oriented operations. When LisaDraw is used to create a box or a circle, it is in fact Quickdraw in control, not the application program.

The application program — LisaDraw in our example — can be thought of as just one way that Quickdraw can present its abilities to the user.

Traditional programming techniques involve the development of fairly large programs built to do some specific task. There's a lot of custom built code to do the specified task, but occasionally these programs will have to reach into onboard ROM memory to access some even more specific routine. Using the hand-held calculator analogy, the functions square root, %, and logarithm are examples.

With the Lisa and Macintosh, Apple designers have reversed the situation. Instead of having programs call ROM-based or library routines, they have made the library routines so sophisticated that they are actually in charge most of the time — it's only when the



The keyboard is well laid-out and very user-friendly

BENCHTEST

user tries to do a task, which the applications code is far better suited to handle, that control is handed over to the application.

A third layer is the Toolbox code (the Lisa has the Toolkit). The Toolbox code is a key feature on the Macintosh since it is the means by which independent software developers will learn about the inner operations of the machine. The Toolbox facilitates access to and use of the operating environment 'primitives' including menu management, window management, type font management, window contents scrolling and the generation of dialogue and alert boxes (system and error messages to you).

In total, the 64k Macintosh supports over 500 system calls — and although we're not quite at the join-the-dots stage, the new software development approach practiced by Apple is getting close. The 128k main memory is reserved totally for application programs loaded from the microfloppy disk, and the user data (word processing documents, pictures, graphs) entered at the keyboard.

At right-angles to the motherboard, and running up the left side of the machine is the video and power supply board.

Drawing power from the board is the Macintosh's 9in, bit-mapped screen displaying 512 x 342 pixels. This compares with the 12in, 720x364 pixel display on the Lisa. The screen provides a stable image, with no perceptible signs of flicker or waves, and it's possible to work for hours with the machine without the discomfort of eyestrain.

The Macintosh employs both a brightness adjustment control, located just under the screen at the front of the casing, and a Preference type option called the Control Panel.

Via the Control Panel the user can adjust various settings, such as audio signal levels, the speed at which keys will repeat when held down (presently indicated by tortoise and hare icons), and the background pattern of the desktop, which is normally a grey half-tone. The system clock can also be set on the Control Panel.

Two more differences in design between the Macintosh and the Lisa are the mouse and the separate keypad. The mouse has been redesigned with a larger button. The keypad, which is an integral part of the Lisa keyboard, comes as an optional extra that daisychains onto the Macintosh keyboard.

Software

The Macintosh's proprietary operating

system is called the Finder.

The Finder operates in much the same way as the Lisa's Desktop Manager. It maintains the various system icons on the display and reacts to the ways in which the user attempts to manipulate them. If the user selects an icon by pointing at it with the mouse-controlled cursor, and then goes to the menu bar at the top of the screen to 'open' the icon, the Finder must ensure that the operation is successful. If the user selects the litter bin icon and then attempts to put that icon into a word processing document, the Finder must be able to inform the user that such an operation is not allowed by gently returning the litter bin to its original position.

Since the operating system is ROM-resident, the Macintosh comes alive as soon as it's switched on. It checks the microfloppy drive to see if a disk is present and, if it detects one, starts to load its directory into memory.

As soon as the directory information is loaded, a diskette icon appears on the screen. If the disk has already been named, this will appear immediately below the icon. If not, the mouse is used to place the cursor over the disk's default name to select the current text by clicking it once. As a result the new name is typed.

To see the contents of a disk, select the icon by clicking on it once and then use the 'Open' option located in the File pull-down menu. Alternatively, click on the disk icon twice in succession.

The Macintosh does not come with all the desktop icons (Desk Accessories) that the Lisa places at the user's disposal once it's been fully powered up. In some cases, the required icon from the menu bar options at the top of the display has to be invoked. Those available include the calculator (a much simpler version than the Lisa offering), the litter bin (for deleting unwanted files) and a version of the Lisa clipboard (used as an intermediate storage area for data during cut-and-paste operations) called the scrapbook.

It should be borne in mind that while the Macintosh is a very fast 32-bit machine, it only provides single-tasking facilities, but this is not a handicap because the one megabit per second serial ports are interrupt-driven. The user can, for example, run the disk drive, move the mouse, generate music, type a key on the keyboard, and read the serial ports all at the same time. Also, because it's single-tasking, the multiple window capability is less comprehensive than the Lisa's.

MacWrite

MacWrite is similar to LisaWrite, but its

designers have decided to implement some of the standard word processing facilities in a new way.

When MacWrite is loaded the user is presented with a blank screen, and a topline menu bar which offers the options: **File, Edit, Search, Format, Fonts, Style**. To the left of the word **File** is a small Apple logo, which is itself a menu option that will produce a pull-down menu with various sub-options if selected.

The user can start writing straight away, since the MacWrite system is provided with the usual margin defaults. For customising, the margin ruler has to be displayed via the **Format** menu option. The ruler appears at the top of the current document and the margin/tab settings are clearly marked by small triangular icons. These can be picked up with the cursor and moved around at will.

Below the actual ruler markings and margin setting icons, there are two groups of rectangular boxes.

One group, composed of three rectangles and set to the left of the screen, is used to set the document line spacing. Three options — single, double, and triple — are provided.

The second group of four rectangles is set to the right of the screen and is used to select the current document's layout, or justification. The four options are: text left justified, text centred, text right justified, and text justified. Again, the user merely clicks on the required icon to obtain the desired format.

On the pre-production Macintosh which we Benchtested, the MacWrite program came with a wide selection of typestyles.

MacWrite acts as a fairly sophisticated word processing program in many aspects, but it's not the smartest in terms of main memory (RAM) usage. As data is typed in, MacWrite stores it in memory until there's no space left. This limits document size to about six pages. To write larger documents, close the first document and then open up a second document. The text must be printed out sequentially — juggling with page formatting in each document.

MacWrite is not the only word processing program being developed for the Macintosh — independent software developers such as Microsoft are working on their own versions. Virtually all these word processing programs will be more sophisticated than MacWrite in at least one important aspect: they will employ memory swapping, or paging techniques. This will enable users to create documents that are limited in size purely by the capacity of the microfloppy disk drive

B E N C H M A R K T E S T

(400k minus directories, damage repair code, and other system necessities).

MacPaint

MacPaint is not a structure editor — it's a bit editor; the position of any single pixel on the screen can be altered even if it's a part of some larger picture. There are a number of ways to do this.

If a square is drawn and filled with a grey pattern, part of that square can be sliced off by selecting the dotted outline rectangular icon from MacPaint's palette. This icon allows the user to grab all or part of a picture by encompassing it with a shimmering dotted outline box. The outline can be expanded by pulling its lower right corner down and to the right, and shrunk by pushing the lower right corner up and to the left.

Once part of a picture has been 'grabbed', the shimmering outline solidifies and the selected area can be picked up and moved to any other location on the display. Any of the normal cut-and-paste type of menu options can also be applied.

The MacPainter can choose from many on-screen options, and even some of these can be adapted if necessary. Down the left of the screen there is the main palette which contains 20 permanently displayed options. In addition to the dotted outline box, there is the lasso icon which is a very powerful addition to a graphics system. Since we are dealing with a bit editor, and not a structure editor, situations will often arise where the user wants to grab a piece of text, or an irregularly shaped object without grabbing any of the surrounding empty space. The lasso icon allows this.

Unlike the Lisa, and unlike the Lisa-Draw application, MacPaint does not provide a multi-windowing capability and there are no window border controls for scrolling information. Work with one MacPaint document must be completed before another can be opened. Instead of border controls MacPaint's designers have included an icon of a hand in the palette. This can be used to push the screen in any of the four directions.

Text can be included and there are a number of options for drawing geometric shapes. Such shapes can be automatically filled with a pattern if so desired.

The really impressive palette options that show the capabilities of a bit-oriented graphics editor are the airbrush, pencil, paintbrush and eraser. Across the bottom of the MacPaint screen there is a selection of 38 patterns.

The first time the airbrush is used, only a few pixels will be deposited. As a

Technical specifications

Processor	68000 Motorola running at 4MHz
Memory	128kRAM; 64kROM
Disk drives	3.5in Sony microfloppy
Measurements	13.5in high × 9.7in wide × 10.9in deep
Operating System	Finder (ROM-based)
Interfaces	Mouse connection, external disk drive connector, serial output port modem, 4-channel sound output connector
Screen	B/w 9in bit-mapped, 512 × 342 pixels
Applications	MacWrite, MacPaint, MacTerminal, MacDraw, MacProject, Macintosh Basic, Macintosh Logo, Macintosh Pascal, Macintosh Assembler/Debugger, Toolbox, Quickdraw
Weight	Approx 20lb

specific area is focused on, the chosen pattern will become more and more prominent.

The pencil icon is used to draw freehand lines, of various thicknesses, and when this is selected the cursor takes on the form of a tiny pencil. It makes signatures and creative artwork quite easy to do, although practice is needed to obtain good results.

The paintbrush is used to paint freehand lines on the screen, and a wide variety of paintbrush textures as well as widths and shapes are available.

A powerful adjunct to the paintbrush is the mirror option. It's obtained from what is currently being called the Goodies menu bar option at the top of the screen. Mirror allows MacPaint to be set up so that it will automatically produce mirror-image copies of anything drawn. With one setting, if an object is drawn in the bottom left hand corner, MacPaint will produce mirror images in the other three corners. With another setting, if a name is written at the top of the screen, MacPaint will produce an inverted image below it.

Fat Bits is another possible selection from the Goodies menu option. At certain points in the use of MacPaint, a method of removing or adding just a few bits here and there from a picture is needed. For example, a line may look a little jagged where it meets another line, and this can be corrected by removing a few pixels from one of the lines. Fat Bits allows you to zoom in on an area of your picture and to add or take away parts of a drawing a pixel at a time. The pencil can be selected to add pixels (click once in a clear area) or remove pixels (click once on an unwanted pixel). The effect of this work is shown in a small box inset at the top left of the picture.

The eraser icon is used to delete any part of a picture. When this is selected, the cursor changes into a small box which can be used to rub away large areas or, if you have a steady hand, a few rogue pixels which are spoiling the picture. At times, the eraser box was too

large to fit into all the nooks and crannies of a drawing. It would be preferable to have the option of choosing the size and shape of the eraser, in the same way that the size and shape of the paintbrush can be selected.

By itself, MacPaint is a powerful graphics program; the fact that Apple will soon be releasing MacDraw, which will presumably be a structure-oriented graphics package, makes the Macintosh very inviting indeed.

The initial software packages to be available for the Macintosh from Apple this year include MacWrite, MacPaint, MacPascal, MacBasic, MacLogo, MacAssembler/Debugger, MacTerminal (communications), MacProject (project evaluation) and MacDraw.

Independent software

According to Apple, over 100 independent software developers are working on products for the Macintosh. Included among these are Microsoft, which looks as if it will redesign many of its current packages for use on the Macintosh, and Lotus Development Corporation, which intends to produce a Macintosh version of the 1-2-3 package. Allied with the interest from add-on hardware vendors this suggests that users will soon have a wide range of software and/or hardware options from which to choose.

Lisa 2

During the time we were shown the Macintosh, the development team stressed that the machine was part of the 32-bit family of Lisa technology.

This seemed a little confusing at first. Since the machine uses 400k microfloppy drives and the Lisa uses unique 5¼in, double access slot diskettes that can store over 800k, it seems Apple is heading for all sorts of problems with compatibility between the two machines.

The company has dealt with the problem in an interesting manner by launching three new versions of the Lisa: the Lisa 2, the Lisa 2/5 and the Lisa



The mouse is a versatile little beast

2/10. All these machines come with 512k main memory as standard, instead of the usual 1Mbyte of RAM.

Apple has overcome the compatibility problem by making the Lisa and the Macintosh employ the same disk media (the 3.5in microfloppy) and has begun to develop the necessary software to allow the Lisa to emulate the Macintosh. This is a compatibility strategy that few people expected.

It raises the possibilities of software organisations buying Lisa systems to develop code quickly for the Macintosh, and of office workers in general using Macintosh systems at home and then taking disks to use with their Lisa systems in the office.

This seems more feasible than the Personal Computer/PC Junior exchange which people were expecting from IBM.

AppleBus & AppleLine

The recently developed AppleNet, which was built around an Ethernet-type communication protocol, has been supplanted by the simpler AppleBus and AppleLine products. Having decided that there was too much chaos in the local area network (LAN) arena, Apple felt the best approach was to leave such heady stuff to companies like IBM — which appears to have opted for a token ring networking system — and to make sure that Apple products could connect up to whatever IBM brings to the LAN market-place.

Physically, AppleBus is nothing more complicated than a single cable containing shielded twisted pair wires. With the right connectors, this cable can be attached to either/both of the serial ports at the back of the Macintosh and the Lisa.

In the simplest configuration, a Macintosh will communicate with another Macintosh or a Lisa. In more complex, corporate environments, AppleBus provides the ability to link up to 16 devices that are up to 1000 feet

apart. Apple is making the full specifications and protocols of AppleBus available to all interested communication software developers and equipment vendors.

AppleLine, on the other hand, is Apple's main way of entering the enemy camp.

It's a hardware add-on with software that will allow Apple computers to hook up to an IBM cluster controller (not unlike the Irma board that turns the IBM PC into a 3270-type terminal). With the equipment installed, and the right data transfer software in use, the Macintosh or Lisa will then look to the IBM controller as if it were an IBM 3278 terminal. In fact, it will be possible to connect up the Apple IIe and the Apple III in a similar manner in the not too distant future.

AppleBus costs will depend on the type of configuration installed, but the cable will be sold on a 'so much per metre' basis. The AppleLine product should retail for about \$1300.

Prices

	\$
Macintosh	2495
External disk drive	395
Separate keypad	99
Mac carrying case	99
Security kit	49
Imagewriter printer	circa 500
Modem 300	225
Modem 1200	495
AppleLine network product	Under 1300
Box of ten diskettes	49

Documentation

No documentation was available for review but an Apple spokesperson described the Macintosh user manual as only having about 100 pages. It comes with a tutorial disk called Guided Tour (similar to Lisa Guide) and a cassette. All Macintosh application manuals are expected to have three sections: standard textual run-down of the application features, a 'cookbook', or task oriented section and a tutorial. Apple's documentation has always been good when compared with the average burnt offerings and it looks as though the Macintosh technical writers will carry on in this tradition.

No Benchmarks are given as Basic has not yet been implemented on the Macintosh.

Conclusions

There is no doubt that Apple has been suffering growing pains over the last year or so. IBM has been the primary adversary with its office oriented Personal Computers, and now the home oriented PC Junior. The PC Junior will obviously affect Apple IIe sales.

Steve Jobs frankly admits that the IBM PC was a milestone in the personal computer industry because it gave the personal computer a much needed credibility in the office market. But he also frankly states that the Macintosh will be the next milestone.

There is only one standard configuration of the Macintosh. The main customisation of the machine will occur through software. As add-on devices are built — there is already talk about a hard disk option under development at Tecmar — access to the machine will be through its two 1 megabit per second serial ports. Apple's notion is that hardware is important, but you can no longer force the user to be a system builder. Apple still sees itself as the company that makes computers for individuals rather than the anonymous office worker, and makes this appeal in its US marketing approach.

Based on our brief experience with the Macintosh, the only danger seems to be that some of its graphics interface features border on being too whimsical. How many times can you look at a whimsical icon before you tire of it?

The Macintosh is a powerful machine with a growing number of powerful applications programs, and it follows the standards set by the Lisa. For \$1995 you get a basic machine; by the time you add on various software programs (for example, MacBasic, MacWrite and MacPaint, an extra disk drive, an Imagewriter printer and a pack of ten blank diskettes), the end product is a \$3550 computer which can do both run-of-the-mill tasks and highly individual work.

If hard work meant success, Apple would have no problems; but in today's market-place, other factors like marketing strategy seem to be more important, and this is something Apple has had to learn quickly. Apple is one of the few companies that could take on the IBM/MS-DOS *de facto* standard with any chance of winning, and the Mac is a terrific weapon with which to enter battle.

END



Above the interface ports are icons describing their respective functions

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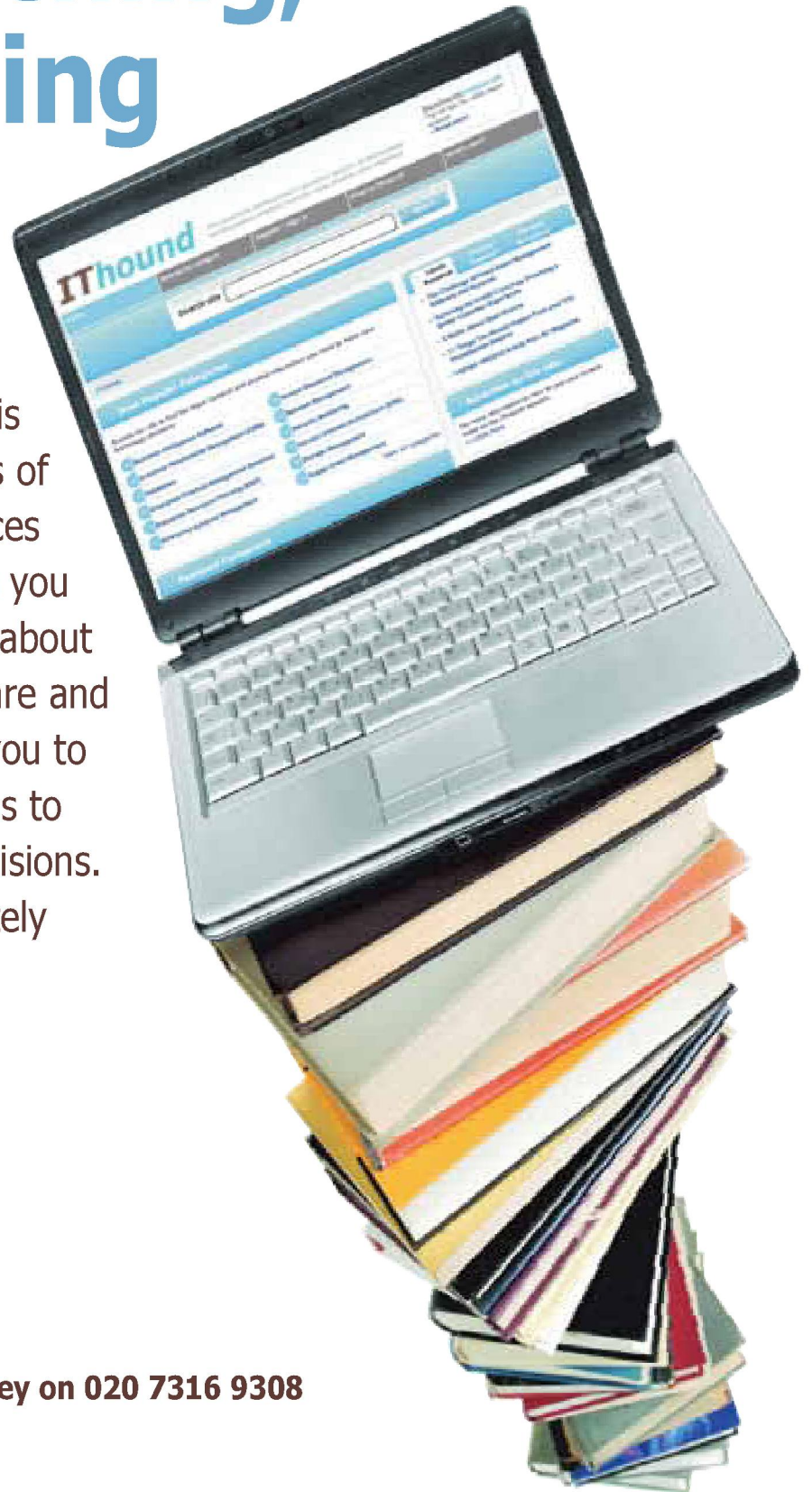
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For all enquiries contact Paul Harvey on 020 7316 9308
or email info@ithound.com

www.ithound.com



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FOOD OF LOVE – WIRELESSLY

Whether it's music or movies that take your fancy, streaming media around the home is becoming more and more popular. So too are network hard drives, where you can store files that you want to access from anywhere, rather than having to keep a particular PC turned on. In the first of this month's group tests, we look at devices that combine the two, in the shape of Nas units that can stream music and video to your PC, media player or even some of the latest TV sets.

You will, of course, need a network and for many people the most convenient way to network their home is wirelessly. The latest wireless routers offer better performance, as long as they're matched with a suitable adapter in your computer, and a range of other useful features, depending on your needs and budget. In the second of this month's group tests, we put six of these routers through their paces, from the most basic, to all-singing, all-dancing models.

We also take a look at Nokia's new touchscreen phone, a tablet computer from HP, AMD's latest processor, and plenty more.



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OUR SCORING

Excellent ★★★★★ Very good ★★★★☆ Good ★★★☆☆ Below average ★★☆☆☆ Poor ★☆☆☆☆

OUR AWARDS

Editor's Choice: The best product in a comparative group test. Anything that wins this award is of better quality than its competitors.

Recommended: A product that combines great features, usability and value for money.

Great Value: Not the best in class, but a product that has superior features and performance for the price.

Best Buy: The best product in its class in terms of performance, features and value for money



REVIEWS



'We cherish Nas devices the most when they serve videos, photos and music around the house'

Read the review on page 96

TABLET PC

HP Touchsmart tx2-1020ea

A tablet-style laptop with a multi-touch navigation feature



Mediasmart Photo allows you to browse through photos by swiping images with your fingers

HP isn't calling its new Touchsmart tx2 a tablet, but with a screen that swivels and folds back on itself it certainly looks like one. We can forgive HP for not wanting to use the T-word though, since tablet PCs have never really taken off.

Unlike previous touchscreen laptops, the Touchsmart tx2 can be navigated with two fingers on the 12.1in display – a technique made popular by the iPhone.

The multi-touch capabilities are best used in HP's Mediasmart applications which come pre-installed and comprise DVD, music, photo, TV and video tools. In Mediasmart Photo, for example, you can browse your photo collection by swiping images to the left or right with one finger, dragging two fingers apart to zoom in and pinching to zoom out. You can also rotate photos by holding one finger still and dragging another around it in a circular motion.

Some gestures will also work in other Windows apps; we managed to zoom in and out within Google Earth and Internet Explorer, for example. However, some of the more useful gestures found on Apple's Macbook range, such as being able to scroll up and down through documents and web pages, aren't available.

A stylus is included to make use of Windows' built-in tablet PC features, such as the Journal application. When the stylus is in use the Touchsmart tx2 stops recognising finger presses on the screen, so you can use it without your wrist getting in the way.

Touch-capabilities aside, the Touchsmart tx2 has a reasonable amount of processing power thanks to the AMD Turion Ultra ZM-84 CPU, running at 2.3GHz. This is backed up by 4GB of Ram. Graphics are handled by an ATI Radeon HD 3200, which is a

step up from integrated graphics, but nothing exciting.

In our benchmarks, it notched up a score of 3,859 in PCmark05, which indicates it's very capable of handling basic Windows tasks along with more demanding activities such as video editing. As expected, graphics performance wasn't as good, with 3Dmark06 returning a score of 1,652 at a resolution of 1,200x800. This increased to 1,856 when we dropped the resolution to 1,024x768, but if you're looking to play games you will have to lower the detail settings.

HP has furnished the Touchsmart tx2 with a decent selection of features. Logging in to Windows is made easier thanks to the built-in fingerprint reader, while a slim media remote control slots neatly into the 34mm Express card slot. There's no Firewire, but three USB2 ports are available. You also get a multifunction card reader and Lightscribe-compatible DVD writer.

Two batteries come as standard: a four-cell model and another eight-cell. Unfortunately, the eight-cell unit adds considerable bulk to the unit and pushes the total weight up to 2.3kg (excluding power adapter). Running at full pelt, we managed one hour and 11 minutes with the four-cell battery, while the eight-cell managed two hours, 26 minutes. If you conserve your usage, you can expect up to two hours' use with the four-cell and around four hours with the eight-cell.

Windows has some excellent tablet PC features, and the Touchsmart tx2 is a well-designed machine that puts them to good use. However, we were hoping for a little more from the multi-touch feature. We hope HP will add extra functionality (such as additional multi-finger gestures) via future software updates, but at present it's a little disappointing and doesn't offer much over other tablet PCs we've seen. *Will Stapley*

Performance



*Tested at 1,024 x 768 in 32-bit colour

Verdict

Pros Multi-touch screen; makes good use of Windows' tablet features; two batteries as standard

Cons Limited multi-touch gestures; mediocre performance

Overall Good range of features, but we were hoping for more from HP's multi-touch capable screen

Features	★★★★★
Performance	★★★★★
Value for money	★★★★★
Overall	★★★★★

Price £999

Contact HP 0845 270 4142

www.hp.co.uk

Specifications AMD Turion X2 Ultra ZM-84 (2.3GHz) • 4GB Ram • 12.1in touchscreen (1,280x800) • ATI Radeon HD 3200 (64MB) • 400GB 5,400rpm hard drive • 3 USB2 • 34mm Express Card • 802.11n • Bluetooth • Gigabit Lan • Four- and eight-cell batteries • 306x224x39mm (wxdxh) • 2.1kg • 1yr warranty

GAMES PC

Cyberpower Gamer Infinity 600

A reasonable gaming system at an affordable price



There are lots of case fans, each of which is backlit with a blue light

Cyberpower is well known for producing some blisteringly fast gaming systems, many of which feature extreme overclocking and watercooling, aimed at hard-core gamers who want a leading-edge system off the shelf. The Gamer Infinity 600 is right at the other end of the range, a budget gaming system that offers reasonable performance at a value price.

At the heart of the system is an Intel Core 2 Duo E8500 dual-core processor, clocked at 3.16GHz and backed by 4GB of G.Skill PC2-6400 DDR2 memory which runs at 800MHz, all of which is available to the operating system, the 64-bit version of Vista Home Premium. Even though the motherboard has four Dimm slots, it can only support 4GB of memory so you are at the maximum already. In terms of performance the PC fares well, scoring 7,860 in PCmark05, which is pretty good for this price. It manages a pretty respectable score of 4,845 in the more demanding PCmark Vantage too.

The CPU and memory sit in an MSI P31 Neo V2 motherboard that uses Intel's P31 value chipset and has passively cooled North and Southbridges. Although the board doesn't appear to be laden down with features, all the essentials are present. There's integrated Gigabit Ethernet, eight-channel audio and four Sata ports. For expansion you get a single PCI x1 slot and three standard PCI slots. The single x16 slot is filled by the graphics card.

Powering the graphics is a passively cooled Sparkle Geforce 9500GT with 1GB of GDDR2 memory, running at 800MHz and a 550MHz core clock, which will allow you to play some basic games, but for today's high-end games you will have to lower your

gaming resolution and the in-game detail. We tested the graphics setup by using World in Conflict's in-game benchmark and, at a resolution of 1,024x768 pixels with all the in-game details set to maximum, the system produced an average frame rate of just 20fps. That's not playable by any stretch of the imagination, but by setting all in-game details to medium where possible we got a much more playable average of 47fps.

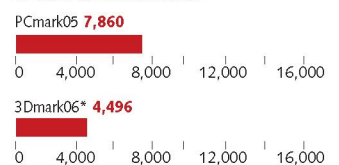
The graphics card drives a 19in TFT monitor, the HannsG HG191, which is a widescreen monitor with a 1,440x990 pixel resolution and comes with a pair of built-in 1W speakers.

The compact Bosse Galaxy III case comes with four 5.25in drive bays, three of which are free, and six 3.5in drive bays, five of which are free and two have external access, which is ideal if you want to add something like a Flash card reader at a later date. Sitting in the fourth of the larger bays is a 22-speed DVD burner, while the one occupied 3.5in drive bay is used by the 320GB hard drive. Despite the size of the case there is ample space to add more drives.

The one thing you'll notice with this PC is that, although it is a budget system, Cyberpower hasn't skimped on the fans and, even with three case fans and a standard Intel CPU cooler, it's still pretty quiet.

If you like your systems to light up then this one won't disappoint as it's very, very blue, with all the case fans backlit with blue LEDs. The two sides of the front bezel have a blue feature and if that isn't enough there are two blue cold cathode tubes fixed to the floor of the case. Finishing off the hardware bundle is a Logitech Value keyboard and mouse. *Simon Crisp*

Performance



*Tested at 1,024 x 768 in 32-bit colour

Verdict

Pros Well-balanced system; plenty of space for extra drives

Cons Lighting can get annoying after a while

Overall If you want a system that gets you on the gaming ladder and can expand as your capabilities grow then Cyberpower's Gamer Infinity 600 is worth a closer look

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Price £499

Contact Cyberpower

www.cyberpowersystems.co.uk

Specifications Intel Core 2 Duo E8500 (3.16GHz) • 4GB PC2-6400 DDR2 Ram • Nvidia 9500GT 1GB graphics • 320GB hard drive • 19in display (1,440x990) • 450W PSU • Microsoft Vista Home Premium 64-bit

ALL-IN-ONE PC

Advent AIO200

A convenient all-in-one – as long as you're not a gamer



We looked at Advent's netbook-based AIO100 all-in-one last month, this month it's the turn of its bigger brother, the AIO200. Reminiscent of Apple's iMac it features a 22in TFT screen behind which sits a quad-core processor and Nvidia-powered graphics.

The Intel Core 2 Quad Q8200 is clocked at 2.33GHz and backed by Intel's G35 chipset and 2GB of PC2-5300 DDR2 memory, which will keep Vista Home Premium happy. It all gives the AIO200

reasonable overall performance, demonstrated by its PCmark05 score of 6,641.

The screen has a native resolution of 1,680x1,050 pixels providing sharp details and warm colours. The only downside is that the screen is a little dull – but it's still one of the better all-in-one screens around. Built into the top bezel of the screen are a 1.3-megapixel webcam and a microphone.

Powering the graphics is an Nvidia GeForce 9300M GS with 256MB of dedicated GDDR2 memory, giving the AIO200 reasonable but not great graphics performance; it can only just handle older games, proved by an average score in our World in Conflict test of a very unplayable 5fps at a resolution of 1,024x768. The speakers aren't the best either: with weak treble and over-compensated bass, the sound gets lost, so to get the best out of the AIO200 you really need a set of external speakers.

There's a 500GB hard drive, though thanks to the built-in hybrid TV tuner card, you may start filling that up a bit quickly. There's also a slot-loading DVD burner, a 3-in-1 card reader, 802.11a/b/g Wifi, Gigabit wired Ethernet and six USB ports. Rounding off the hardware package are a keyboard, mouse and a small remote control.

Simon Crisp

Verdict

Pros Good design; good screen**Cons** Gaming performance; lack of eSata ports

Overall Advent's AIO200 has an excellent screen and reasonable overall performance. It's just a shame you don't get better graphics for the price, which is a little high compared to some of its competitors

Features ★★★★★**Performance** ★★★★★**Value for money** ★★★★★**Overall** ★★★★★

Price £799.99 (web price)
in-store price £849.99

Contact PC World

www.pcworld.co.uk

Specifications Intel Core 2 Quad Q8200 • 2GB PC2-5300 DDR2 Ram • Nvidia GeForce 9300M GS • 500GB hard drive • 22in display (1,680x1,050) • 802.11a/b/g • 1.3-megapixel camera • 6 USB ports • 533x220x501 (wxdxh) • 1yr return-to-base warranty

LAPTOP PC

Sony Vaio VGN-FW31ZJ

A stylish laptop that can play high-definition movies



Sony's Vaio FW31ZJ entertainment notebook has a 16:9 aspect screen, full HD support, and a built-in Blu-ray drive. The stylish magnesium chassis is finished in silver with a mesh grille above the keyboard housing the speakers and media centre control buttons; this is matched by the mesh-like finish to the touchpad. However, at 3.2kg it's at the higher limit of what you'd want to lug around.

Powering the FW31ZJ is an Intel Core 2 Duo T9550 which zips along at 2.66GHz, supported by

4GB of 800MHz DDR2 memory, more than enough to keep the 64-bit version of Vista Home Premium happy and give the FW31ZJ very reasonable performance. It scored 3,985 in the demanding PCmark Vantage, which is pretty respectable for a notebook.

The 16.4in X-black panel screen has a native resolution of 1,920x1,080 pixels so it supports full HD, and has an aspect ratio of 16:9, which is ideal for watching movies via the built-in Blu-ray burner. The screen does reflect lighting a little but it's nowhere near as bad as some we have seen. Colour reproduction and contrast are first rate. There's also an HDMI port to connect to an external HD screen.

Powering the graphics is an ATI Mobility Radeon HD3650 with 512MB of dedicated GDDR3 memory. Even so, it struggles with the latest games; using World in Conflict's built-in benchmark at 1,024x768, it only averaged 13fps, with all the in-game details set to maximum. Reducing these and lowering the resolution may increase the frame rate, but it will still be a struggle.

There's a 500GB 4,200rpm hard drive, a Memory Stick reader and an SD card slot. Battery life is good for something that will be plugged into the mains most of the time; just less than two hours for watching a DVD, and two and a half hours for normal use. *Simon Crisp*

Verdict

Pros Good feature set; very good screen; Blu-ray drive**Cons** It's pricey

Overall Sony's FW31ZJ is a very good, if pricey, full HD entertainment notebook with an excellent screen

Features ★★★★★**Performance** ★★★★★**Value for money** ★★★★★**Overall** ★★★★★**Price** £1,199**Contact** Sony Style Europe

www.sonymystyle.co.uk 020 7365 2947

Specifications Intel Core 2 Duo T9550 (2.66GHz) • 4GB 800MHz DDR2 Ram • ATI Mobility Radeon HD3650 (512MB dedicated VRam) • 500GB hard drive • 16.4in 16:9 aspect ratio screen (1,920x1,080) • 802.11a/b/g/Draft n • 1.3-megapixel camera • Intel HD audio • 384x261x29/37 (wxdxh) • 1yr warranty

SMARTPHONE

Nokia 5800 Xpress Music

Is Nokia's latest touchscreen phone all fingers and thumbs?



The 5800 Xpress Music is Nokia's latest foray into the touchscreen mobile phone market

Touch is the latest trend in mobile phones; popularised by Apple, just about everyone has brought out new devices recently – with the exception of Nokia. That's now been rectified with the 5800 Xpress Music. At £250 without a contract, and free with many, it's not perhaps targeted directly at the iPhone, but many will doubtless compare the two.

The 5800 is chunkier, but not excessively large; it slips nicely inside the pocket and feels fairly robust, even though it has a plastic case.

A small lip around the screen sets the look apart from the iPhone, as does the collection of three physical buttons just below it; green and red call and end keys flank a white menu button, which gives access to the main menu screen that will be familiar to anyone who has used a Symbian device before. Above the screen there's small Xpress Music icon, which also responds to touch, and the front camera. The top of the case has power and USB sockets, together with the power switch, while the left has flaps covering SIM and MicroSD slots; on the right there's a slider that locks and unlocks the screen. On the rear is a camera, though it needs good lighting to get decent results. The screen rotates as you turn the phone – turning it face down will mute incoming calls or alarms.

On the whole, the interface works fairly well. If you're used to current Nokia smartphones, there are no surprises; the 5800 uses Series 60 fifth edition. Most elements of the screen can be tapped to select things, so tapping the clock on the home screen opens the app, and allows you to set an alarm. Tapping on the network name opens the profile list, and allows you to go to the calendar. The Xpress Music icon on the front panel gives quick access to media functions. But we

had some niggles; on tabbed dialogues, it's a bit fiddly at times to move from one tab to the next.

Nokia uses a resistive touchscreen so there's none of the multitouch functionality found on other devices. You can scroll by dragging a finger, but for things such as zooming, you'll have to call up a menu or double-tap in the browser. That said, it's still pretty easy to use.

Dialling a number is straightforward; tap one of two icons on the home screen to open the keypad, or the other to go to the address book. Scroll and pick a name, or tap in the blank space, and you can then press the first letter on an on-screen keypad, narrowing down subsequent choices.

For text entry, there's a choice of an alphanumeric keypad on screen, with Nokia's predictive text, a small Qwerty one – which really needs you to use the stylus – or a full-screen Qwerty, which works in landscape mode; turning the phone doesn't switch between small and full screen keyboards, annoyingly. There's also handwriting recognition, which we found worked reasonably well.

Around the rest of the phone, it's standard Nokia smartphone fare – the browser is adequate and media playback is good – the screen is excellent. The fifth edition of Symbian S60 tidies a few things up; icons get a new look, and though the mail application still lacks really good Imap support, it does make it easy to hide older messages. You will probably need to update your favourite apps – none of ours would install. In normal use, we got three days between charges.

As a mid-market touchscreen phone, the 5800 is pretty good; it's not excellent, but it's far more than a simple grafting of a touchscreen onto Nokia's existing smartphones – definitely worth a look. *Nigel Whitfield*

Verdict

Pros Familiar interface; good price and feature set

Cons No multi-touch; some interface quirks; camera not that good

Overall Nokia's latest touchscreen is easy to use and feature-rich, but with a few interface quirks to be ironed out

Features	★★★★★
Performance	★★★★★
Value for money	★★★★★

Overall ★★★★★

Price £249, from free on contract

Contact Nokia, 0800 331 6021

<http://shop.nokia.co.uk>

Specifications 3.2in 16:9 screen, 640x360 resolution • Accelerometer to detect rotation • Assisted GPS; Bluetooth; Wifi 11b/g • HSDPA 3.6Mbps/sec • GSM & 3G quad band • Micro USB • Micro SD card slot • AV output • 3.2-megapixel camera • Video recording up to 630x480 30fps • 109g • 51.7x15.5x111mm wxdxdh

GRAPHICS CARD

His HD4870 IceQ 4+ Turbo

A high-performance graphics card that's quietly cooled



The IceQ 4 series from His has a custom heatpipe cooling solution, allowing for quieter and more efficient cooling, which in turn allows His to increase clock speeds from the reference design. The current flagship of the IceQ4 range is the HD4870 IceQ 4+ Turbo, which has an overclocked core engine and 1GB of overclocked GDDR5 memory.

The HD4870 (RV770) GPU is built on a 55nm process and has 800 stream processors running at 750MHz – the same as the engine clock. It supports

GDDR5 memory via a 256-bit interface and a 900MHz clock speed but, because of the way GDDR5 works, the effective memory speed is 3,600MHz. As standard the HD4870 comes with 512MB of memory which gives the HD4870 a bandwidth of a staggering 115.2Gbytes/sec.

His has modestly tweaked both clocks on the IceQ 4+ with the core clock running at 770MHz. It has also doubled the memory to 1GB of GDDR5 as well as overclocking it, the memory clock running at 1,000MHz (4,000MHz effective).

To keep all this running as coolly as possible, the IceQ 4+ cooler comes with a thicker metal cooler base and larger than normal 8mm heatpipes.

To power this beast, His recommends a 500W power supply at least – it needs to have two six-pin PCI Express connectors to run normally or, if you run a pair of cards in a Crossfire configuration, four six-pin or two six-pin and two eight-pin connectors.

At a 1,280x1,024 pixel resolution the HD4870 IceQ 4+ scored 15,235 in 3Dmark06 and an impressive 9,610 in the more demanding 3Dmark Vantage. In real-life gaming it produced an average frame rate of 47fps in World in Conflict and 65.49fps in Far Cry 2. At higher resolutions it is still impressive; 59fps for Far Cry 2 at 1,920x1,200 is still very playable. *Simon Crisp*

Verdict

Pros Performance and cooler design
Cons Software bundle is a little sparse

Overall The His HD4870 IceQ 4+ is one of the fastest single-GPU cards around and it comes at a very good price

Features ★★★★★
Performance ★★★★★
Value for money ★★★★★

Overall ★★★★★

Price £231.38

Contact Yoyotech

www.yoyotech.co.uk

Specifications AMD/ATI HD4870 GPU (RV770) • 1GB GDDR5 VRam • 256-bit memory interface • 770MHz core clock • 1,000MHz (4,000MHz effective) memory clock • 2 Dual-link DVI

CPU

AMD AM3 Phenom II 720 Black Edition

Three cores can sometimes be better than four



AMD has just released five new AM3 (938-pin) socketed versions of its latest Phenom II processors. There are five new models in all, with two X3 triple cores, the Phenom II X3 720 Black Edition and Phenom II X3 710 and three X4 quad cores, the Phenom II X4 810, 910 and 805. It's the X3 720 Black Edition we're looking at this month.

The AM3s are built on a 45nm process and have a 128KB L1 cache (64KB of L1 instruction and 64KB of L1 data) per core, plus 512KB of L2 cache per core for a total of 2MB of L2 cache for the X4 quad core and 1.5MB for the triple-cored X3. The X4 810 and 805

have 4MB of L3 cache while all the others have 6MB. The maximum Thermal Design Power of all five processors is 95W.

All the processors have an integrated 128-bit memory controller which can be configured into dual 64-bit channels for simultaneous read/writes. It supports DDR2 memory up to 1,066MHz (PC2-8500) and DDR3 up to 1,333MHz (PC3-10600). The Hyper Transport 3.0 link supports one 16-bit link up to 4GHz (full duplex), for a total processor bandwidth of up to 33.1Gbytes/sec.

The Phenom II X4 810 offers some stiff competition to Intel's Core 2 Quad and Duo ranges, but when it comes to performance it's overshadowed by the X3 720 Black Edition. It has excellent overclocking potential as its processors have unlocked core multipliers. We found it very easy to overclock and it can run at high speeds just on an air cooler. We had it running stable at 3.7GHz, an increase of 900MHz, just by increasing the multiplier in AMD's Overdrive utility from 13x to 18.5x and increasing the CPU voltage to 1.53v, cooled via an Akasa AK-876 heatpipe cooler.

For around £120 the Black Edition is a very well priced and easily overclocked CPU. *Simon Crisp*



Verdict

Pros Excellent performance for the price; easily overclocked

Cons Doesn't have the ultimate multithreading capabilities of a quad-core CPU

Overall The undoubted star of AMD's new processor line-up, its low cost and easy overclocking mean it's the obvious choice if you are thinking about upgrading your current AM2+ setup or building a new AM3-based system

Performance ★★★★★
Value for money ★★★★★

Overall ★★★★★

Price £120

Contact AMD www.amd.com

PROJECTOR

Optoma Pico

A pocket-sized projector to plug into your phone or media player



Optoma's Pico is compact and straightforward; there's an on, off and brightness slider, a focus wheel, plus a mini-USB port for charging and an AV in a socket. The base has a screw thread into which fits an adapter for a standard tripod. A carry case, USB charger and AV cable make up the rest of the package. It comes with two batteries, each with a claimed life of around two hours. The supplied cable has three phono sockets for video, plus left and

right audio. Optional accessory cables link directly to Apple or Nokia devices if you don't have an adapter.

Using it with a mobile phone or media player is one of the most likely scenarios, but here we ran into an annoying problem: the built-in speaker was too quiet – the sound from our mobile was better. But plug an AV cable into many phones and the internal speakers cut out; a pass-through socket on the Pico to get the audio into an external speaker set would be welcome.

With a pixel resolution of 480x320 you won't get brilliantly sharp images, in fact you may see some nasty jagged edges on text and other lines. On a short animated clip, we found this could be annoying, but on ordinary video, it wasn't too bad – and we could even watch with the lights on. We wouldn't recommend this for business presentations, however.

For comparison, the resolution is what you'd expect from a decent VHS tape. We tried the Pico with high-quality composite video from a Laserdisc and the results were pretty good – not a home cinema experience, but adequate. It supports both Pal and NTSC, and switches automatically depending on the signal received. You can get a picture up to 5ft across – but you'll need a darkened room, and it's best to keep things smaller and brighter.

Nigel Whitfield

Verdict

Pros Compact; bright display

Cons Low resolution; poor sound

Overall A handy little projector, but quality isn't good enough for much more than casual use

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Price £249

Contact Optoma Europe

01923 691 800 www.optoma.co.uk

Specifications Resolution: 480x320

• 0.5W speaker • 50x15x103mm

(wxdxh) • Image size: 6-60in •

Projection distance: 0.25-2.6m

WIRELESS AUDIO TRANSMITTER

i2i Stream

Send your favourite tunes to a friend or a home stereo with these wireless transmitters



The i2i Stream is a digital audio gadget designed to send tunes wirelessly from a portable player to another set of headphones, or a stereo system in the home. It does this through two transmitter and receiver units that connect across a configurable colour-coded channel.

The transmitter plugs into a playback device with the supplied cable, whether it's a mobile phone, MP3 player or anything else with a 3.5mm output port. Headphones can then be plugged into the other end

of the unit, which acts as a pass-through device, to enjoy tunes as normal. This audio can also be sent to the receiver, which can be plugged into headphones or an auxiliary port on a stereo. Configuring this process is quick and easy thanks to the onboard controls, and we were impressed by the clarity of the audio on both sides, which is all but indistinguishable from the performance offered by the player itself. i2i Gear quotes a 10m range between transmitter and receiver, which we found to be fairly accurate, and up to three can be used in this space at the same time. It takes five to six hours to charge the battery by USB and you'll get a similar amount of playback time, which is a little less than we'd expected. The devices also feel quite cheap and hollow, so it's disappointing to see that the impressive performance isn't reflected in the design.

Such are the range of possible uses for the i2i Stream though, it's difficult to place too much emphasis on its faults. We can see this being genuinely useful in a range of environments and there are certainly enough advantages on offer to make the detractions bearable. If you're after an effective way to share music on the move or connect a player wirelessly to a sound system in the home, this is a very nice way of going about it.

Paul Lester



Verdict

Pros Great audio quality; easy to set up; wide range of uses

Cons Cheap build; poor battery life

Overall We were impressed by the performance and versatility of the i2i Stream and, despite some minor niggles, would recommend it as a wireless audio streamer

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Price £68.51

Contact www.i2igear.com

Specifications 2.4GHz wireless

transceiver • HD-quality audio

(uncompressed) • Wireless range:

10m • Battery life: five to seven hours

• Frequency response: 10Hz-24KHz •

Bit rate: 48KHz/16-bit stereo

DIGITAL CAMERA

Pentax Optio M60

Low-cost 10-megapixel digicam with some decent features



Small and stylish with a 10-megapixel sensor, it's a surprise that the Optio M60 from Pentax costs just £99. With so little space to play with, Pentax has done a reasonable job of making the buttons small without hampering usability and the camera feels comfortable in the hand. The company has also managed to cram in a 5x optical zoom lens, which is no mean feat with a camera this small. Startup times are impressive and the Optio M60 can capture a shot within four seconds of being switched on.

Those who like a bit more control over their photography can adjust the white balance to one of four presets or even set it manually. Various focusing modes are also on offer, along with exposure compensation and manual ISO settings from 64 up to an extremely noisy 6,400.

As usual, Pentax has gone overboard with the scene modes. There are 24, including Pet, Kids and Flower, but during testing we found the Auto mode did a good job in most situations. Face and smile detection both worked well; when activated, the latter will automatically take a shot as soon as a toothy grin is revealed. Pentax has also included blink detection, which flashes up a warning if it thinks your subject had their eyes shut. In our tests, though, this feature was somewhat unreliable.

Considering how cheap the Optio M60 is, photo quality is reasonable. When viewed close up, however, a fair amount of noise and compression was noticeable, which wasn't helped by the camera frequently opting for unnecessarily high ISO settings, even in broad daylight.

At less than £100, the Optio M60 has some useful features and, although image quality isn't perfect, it's a good compact digicam. *Will Stapley*

Verdict

Pros Small; cheap; good range of manual settings

Cons Fair amount of noise and compression visible; auto ISO settings sometimes unnecessarily high

Overall By no means perfect, but this is a good-value compact camera with some decent features

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Price £99

Contact Pentax 0870 736 8299
www.pentax.co.uk

Specifications 10-megapixel • 1/2.3in CCD • 36-180mm focal length (35mm equivalent) • 5x optical zoom • ISO 64-6400 • 10cm macro • 640x480 movie mode • 36.5MB internal memory • SD card slot • Li-ion battery • 95x23.5x55mm (wxdxh) • 110g

SCANNER

Epson Perfection V300

A good-value scanner, with built-in features to digitise slides and negatives



You might think that with the huge range of multifunction devices (MFDs) available these days, there wouldn't be much demand for the humble flatbed scanner, but you'd be wrong. The scanner in a typical MFD is fine for doing all the everyday jobs, but when it comes to making high-resolution scans of your treasured photos a standalone flatbed scanner is the only answer. One of the best value-for-money 48-bit scanners around at the moment is Epson's Perfection V300.

Simple to use, with just four shortcut buttons, the V300 can scan legal documents, 35mm slides and transparencies up to 4,800dpi at 48 bits. Another of its benefits is its Readyscan LED technology which considerably lowers the warm-up time.

It's quite slimline, measuring just 430x280x66.5mm (wxdxh) but it is solidly built and the lid is hinged from the side with an extendable hinge, so the V300 can scan magazines and books up to 25mm thick. The lid also houses the light unit used for scanning slides and negatives, hidden behind a white plastic cover when not in use – a good design feature as many other scanners require a change of lids to allow film scanning.

The four shortcut buttons on the top control all your needs; power button, scan to a printer, scan to email and scan to PDF, or you could use the Epson Scan software which includes an Easy Photo Fix that helps you restore colour to faded photos.

The V300 a quick performer but only at lower resolutions; a 2,400dpi four-slide scan took around four minutes while scanning at 13,000dpi (the interpolated maximum) took around half an hour. But the results are worth waiting for, with sharp bright accurate colours. Even when the results produced some fading, the easy-to-use software soon brought them back. *Simon Crisp*

Verdict

Pros Price; performance at lower resolutions

Cons Very slow at maximum resolution

Overall A good all-round scanner for the home, with the added attraction of being able to scan film and slides without changing lids

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Price £79.99

Contact PC World
www.pcworld.co.uk

Specifications 4,800x9,600dpi Matrix CCD • 48-bit colour output • 3.2 DMax optical density • USB2 interface

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PC Essentials

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Sapphire Radeon HD4670 512MB GDDR4

Price: £75.99

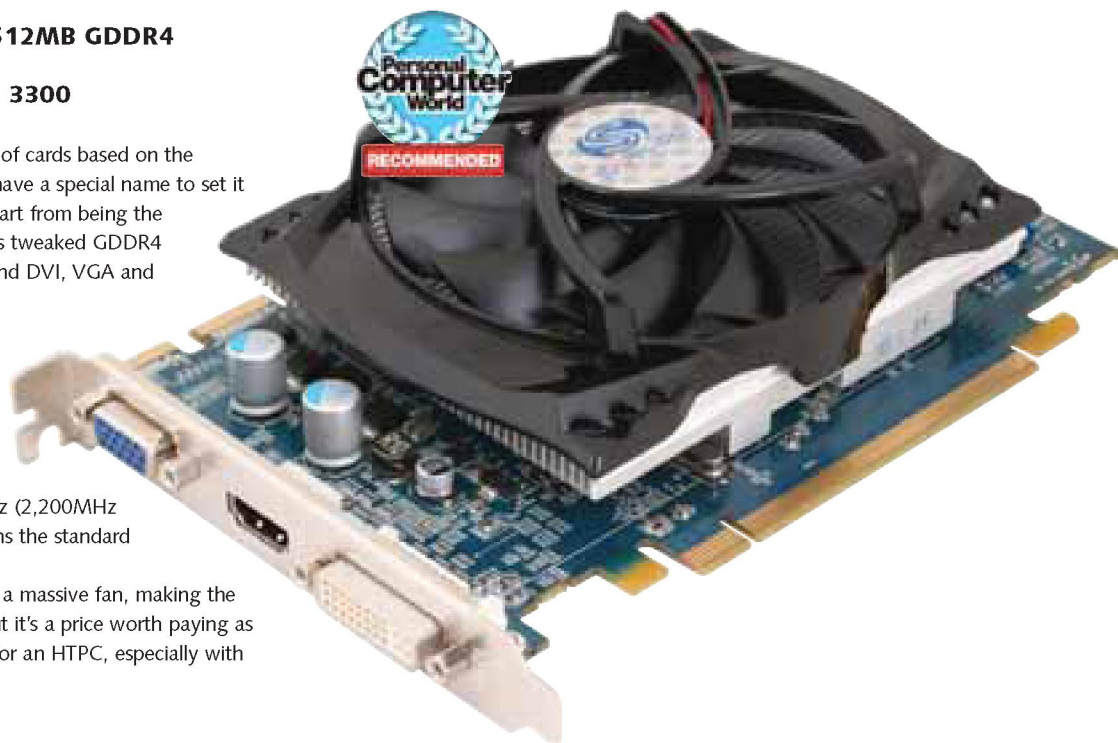
www.ebuyer.com 0871 521 3300

Overall: ★★★★★

Sapphire's latest addition to its range of cards based on the HD4670 (RV730 core) should really have a special name to set it apart from the rest of the line-up. Apart from being the fastest card in the family, thanks to its tweaked GDDR4 memory, it also has a special cooler and DVI, VGA and HDMI ports on the expansion plate.

The reference HD4670 design comes with 512MB of GDDR3 memory running at 1,000MHz (2,000MHz effective) and a 750MHz core clock. Sapphire's card comes with 512MB of GDDR4 memory tweaked to run at 1,100MHz (2,200MHz effective), while the core clock remains the standard speed.

The Sapphire-designed cooler has a massive fan, making the compact card into a dual-slot one, but it's a price worth paying as the cooler is ultra-quiet, just the job for an HTPC, especially with the HDMI port on the backplane.



Gigabyte EX58-UD4P

Price: £202.90

www.scan.co.uk 0871 472 4747

Overall: ★★★★★

As you might have guessed by the name, Gigabyte's EX58-UD4P motherboard is built around Intel's latest high-end chipset, the X58 and the LGA 1366 socket for Core i7 processors.

There's hardly any free space on the board as it comes with no fewer than six Dimm slots – between them supporting up to 24GB of DDR3 memory – three X16 PCI-E graphics card slots (x16, x16/x8, x8), which support either CrossfireX or SLI graphics card setups, dual Bios chips, eight-channel audio with Dolby Home Theatre support, and up to 12 USB ports. Eight of those are on the rear I/O panel and headers for another four are on the board itself.

Both the X58 and the ICH10R bridges are passively cooled, as are the Mosfets (metal-oxide semiconductor field-effect transistors) and the board uses Gigabyte's Durable 3 technology which includes a number of improvements over a standard motherboard, including extra-thick copper layers in the printed circuit board, Japanese solid capacitors and ferrite core chokes, all of which improve power efficiency and help reduce the amount of heat the board generates.



Scythe Mugen 2 CPU cooler**Price: £42.99****www.quietpc.com****0870 321 4620****Overall: ★★★★★**

The second-generation Mugen cooler from Scythe has been redesigned to improve cooling over the original version by having the cooling core split into five columns, with each segment having its own U-shaped heatpipe. It comes with a single 120mm cooling fan but for extreme cooling you can mount three more on it. It supports almost every desktop CPU socket around, including Intel's latest LGA 1366.

**Revoltec Fightmouse Pro gaming mouse****Price: approx £37.50****www.scan.co.uk 0871 472 4747****Overall: ★★★★★**

Revoltec's Fightmouse Pro is a well-priced mouse for gamers, capable of handling up to 3,200dpi, with an ergonomic design that feels comfortable. It looks good too, with the top finished in a carbon-fibre-style pattern.

Users can switch between four custom-defined dpi (dots per inch) levels via a switch beneath the scroll wheel, with the wheel changing colour depending on the setting.

**Zalman VF950 LED graphics card cooler****Price: £34.50****www.quietpc.com 0870 321 4620****Overall: ★★★★★**

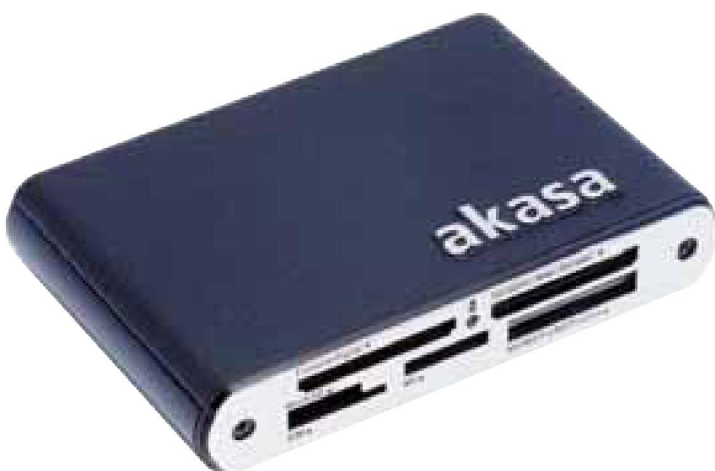
The VF950 LED GPU cooler from Zalman has a copper base and two copper heatpipes that feed through aluminum cooling fins. Cooling is provided by an 80mm cooling fan and bundled in the box is a Fanmate 2 fan controller, which adjusts the fan speed from 2,500rpm down to 1,400rpm. It supports a wide range of graphics cards including AMD's HD4850 and 4830 as well as Nvidia's 9800GT and 9600GT.

**Toshiba MK5055GSX hard drive****Price: £107.59****www.itxwarehouse.co.uk****Overall: ★★★★★**

A huge-capacity drive that is ideal for your multimedia notebook if you need more space, or if you are building a compact home-theatre PC (HTPC). The 2.5in MK5055GSX uses two platters (discs) to reach its 500GB capacity and has a 5,400rpm spin speed, an 8MB cache and a quoted average seek time of 12ms.

**Akasa Elite Card Reader (AK-CR-02BK)****Price: £20.64****www.dabs.com****Overall: ★★★★★**

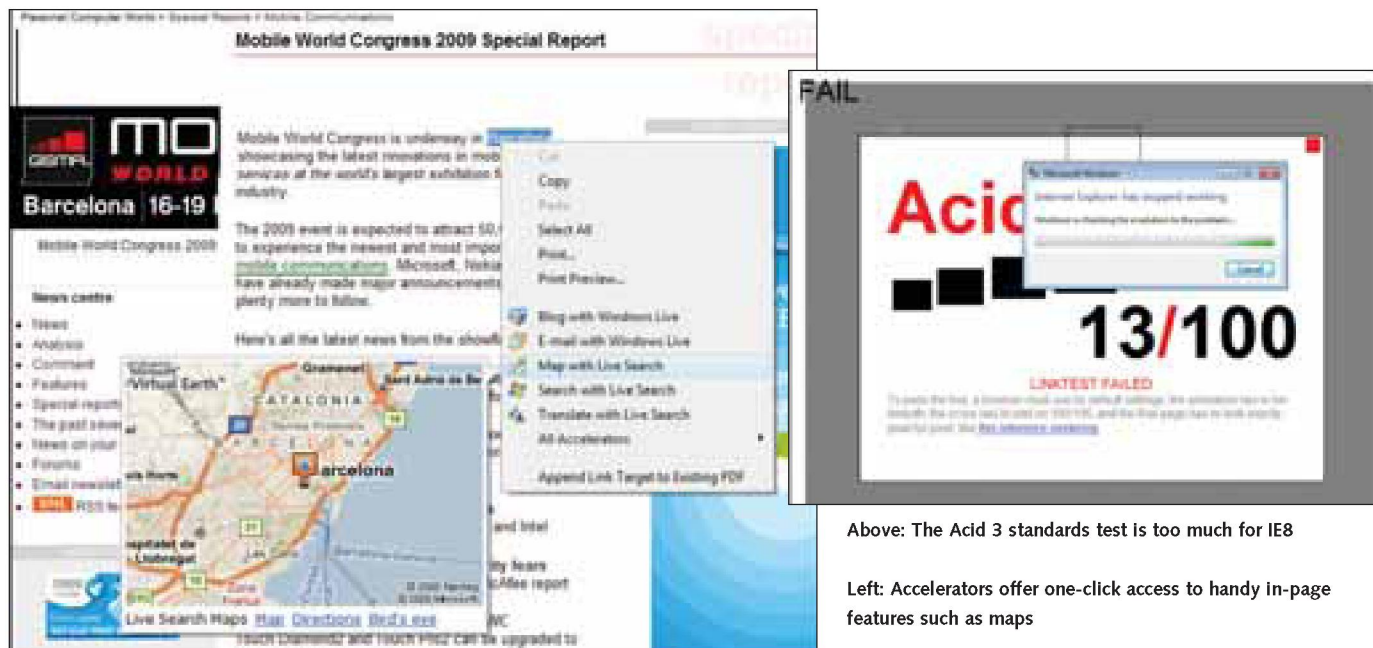
Here's yet another addition to Akasa's leather-finished Elite range. The eight-slot Flash card reader supports most formats including MicroSD and M2 without adapters. It supports SIM cards so you can transfer contact details from your mobile phone, and there's also a Smart Card reader for secure online banking if you bank supports it.



WEB BROWSER

Internet Explorer 8 Release Candidate 1

Microsoft's new browser is decent but faces vigorous competition



Above: The Acid 3 standards test is too much for IE8

Left: Accelerators offer one-click access to handy in-page features such as maps

When Microsoft showed the first Internet Explorer 8 beta at the Mix 08 conference in Las Vegas, it was widely applauded for delivering a standards-compliant browser at last, successfully rendering the Acid 2 test page from the Web Standards Project. But is it too little, too late? Progress seems slow: it's a year since the 2008 Mix, and at the time of writing IE8 has only made it as far as Release Candidate 1. The Web Standards Project has moved on to Acid 3, a more demanding test that IE8 is nowhere near passing; when we tried it, it scored 13 per cent, then crashed the browser. Most other browsers fail Acid 3 as well, though not as badly. Even after IE8 is released, Microsoft will be behind in standards compliance.

That said, the standards compliance in IE8 is a leap forward from IE7, and includes Aria (Accessible Rich Internet Applications), CSS (Cascading Style Sheets) 2.1, HTML 5 Dom storage, enabling web applications to store data on the local machine, and native support for Json (Javascript Object Notation), widely used to manipulate data in web applications. These changes are mostly invisible to users, who just expect websites to work, but matter greatly to the web designers who have the responsibility to make it so, hence the applause at Mix.

Microsoft's problem is that web authors now expect the quirky habits of previous versions, and deliver specially tweaked pages when they detect IE. These pages now break in IE8. The fix is a compatibility view that reverts to the old layout engine, enabled by clicking a button, or by code in the web page itself, or by inclusion on a list of sites maintained by Microsoft. Intranet sites use compatibility view by default. The

compatibility tools work well, but it is unfortunate that Microsoft has had to devote so much energy to this rather than working on new features.

There are a few enhancements. Accelerators offer a handy right-click menu on any selected text, with items that call a web service to bring back further information in a pop-up preview. Accelerate a place name, for example, and you get a map. Web slices install into the Favourites bar, and show concise content from another website, such as the current top topics on Digg, in a dropdown preview. Private browsing, engaged from the Tools menu, lets you browse without storing browser history or temporary internet files, while private filtering blocks selected third-party sites from tracking your web movements.

Crash recovery attempts to isolate crashes to the current tab, rather than closing the entire browser. This worked with our Acid 3 crash, though IE8 insisted on trying to re-open the crashing page, causing a repeated error. New developer tools in IE8 are excellent for web authors tracing page layout bugs.

Web developers and designers will appreciate it, though it will be years before IE6 and IE7 disappear from view. IE8 is a memory hog, partly thanks to new compatibility and stability features. It is unlikely to win many back from Firefox or other browsers, since its new features are low key, its standards compliance still falls short, and the range of available add-ons is more limited. Internet Explorer does benefit from protected mode on Windows Vista and higher, which runs the browser with restricted permissions for better security, though this is also in IE7. Overall this is a decent upgrade and will be a must-have for users sticking with Microsoft's browser.

Tim Anderson

Verdict

Pros Standards compliance enables the web to move forward; Accelerators, privacy modes and developer tools

Cons Too late; compliance still behind; high memory usage

Overall The best IE yet, but not enough to reverse the trend towards third-party browsers

Features	★★★★★
Ease of use	★★★★★
Value for money	N/A
Overall	★★★★★

Price Free

Contact Microsoft

www.microsoft.com/ie

System requirements Windows XP SP2 or higher • Server 2003 SP2, Vista • Server 2008 • Windows 7

SECURITY SOFTWARE

Ad-Aware Pro Anniversary Edition

An anti-malware suite that is effective and easy to use



The anniversary edition of Ad-Aware, the virus and malware detection and removal suite, celebrates 10 years of offering home users a free way to protect their system against the latest threats. The Pro version on test adds network drive support, more advanced control over the Ad-Watch component and a range of additional tools, including a process and startup manager.

The interface is far tidier than previous versions, since it now integrates Ad-Watch into a single

application, making overall system status far easier to view at a glance. Smart, full and custom scans can be scheduled and were fairly fast to complete. Any detected threats can either be run through Lavasoft's 'recommended' removal process, or manually blocked, allowed, deleted or quarantined.

We were impressed by the comprehensive nature of the system scan and the ability of the Ad-Watch component to prevent incoming threats from affecting your computer, where heuristic detection can identify suspicious activity and request confirmation, even if there is no definition for a particular threat in the database. The suite is now more integrated, efficient and, as claimed, would rarely use more than 18 per cent of CPU time when scanning. Windows' context-sensitive right-click menu also includes a scanning shortcut to target individual files, and pulse updates ensure the latest definitions are received as soon as possible.

We were generally very pleased by how quickly and efficiently Ad-Aware went about its business, and there are enough worthy improvements to help it stand out from previous versions. Although it is targeted toward malware protection, lacking many features of more broader suites, the Ad-Aware anniversary edition is certainly very good at what it does. *Paul Lester*

Verdict

Pros Fast and easy to use; well integrated components; effective detection and removal

Cons Lacks some of the features found in rival suites

Overall If it's an anti-malware detection and removal package you're after, Ad-Aware has made some big strides with this latest version

Features ★★★★★
Ease of use ★★★★★
Value for money ★★★★★

Overall ★★★★★

Price £24.99 (online version is licensed for one PC, retail for three PCs)

Contact Lavasoft www.lavasoft.com

System requirements Intel

Pentium 600MHz or better • 100MB

Ram • 100MB hard disk space •

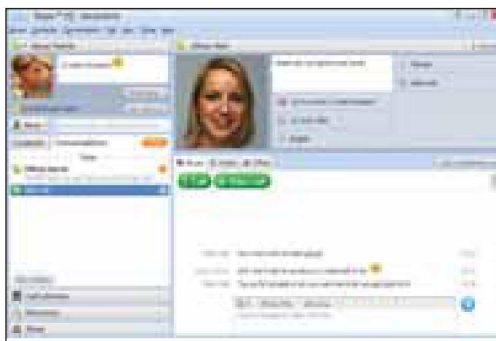
Windows Vista (32 and 64-bit), XP

(32-bit), 2000 Pro

VOIP SOFTWARE

Skype 4

A new interface with improved video calling, but still no three-way video option



Following its beta release back in July 2008, the finished version of Skype 4 is now available. The interface has been totally revamped and, unlike previous versions, everything is now housed within one window; contacts sit on the left, while instant messages, new calls and other notifications are on the right. With so much information on one screen, it does feel a little cluttered at first. A Compact View option is available, though, which splits the interface into two separate windows.

Video calls can now be instigated immediately (previously you had to make a voice call, then activate

the video mode) and expanded to full screen. With its new bandwidth monitor, Skype 4 automatically adjusts video quality so it doesn't end up looking like a series of still photos.

We first tested Skype 4 using two broadband connections that averaged 5Mbps/sec and, although it wasn't what we'd call high quality, the full-screen video was reasonably impressive. When we switched to a 512Kbps/sec connection, video quality dropped noticeably, but it was still pretty smooth.

However, it's a shame that Skype still lacks the ability to invite third parties into a video call. Voice calls have also been improved as a result of a new codec; although we experienced a few cases of delayed audio, on the whole it was extremely impressive.

As with previous versions, if you're prepared to stump up some cash you can make calls to landlines and mobiles. It costs from 1.4p per minute to call landlines (plus 3.3p connection fee), while £2.24 per month will give you unlimited UK calls; the latter is subject to a fair usage policy.

Overall, Skype has done a good job with audio and video quality, but it would have been good to see a few more new features. *Will Stapley*



Verdict

Pros Bandwidth monitor allows for full-screen video calls; good-quality audio; still free

Cons New interface feels a little cluttered; few new features

Overall Audio and video quality have improved, but major new features are thin on the ground

Features ★★★★★
Ease of use ★★★★★
Value for money ★★★★★

Overall ★★★★★

Price Free

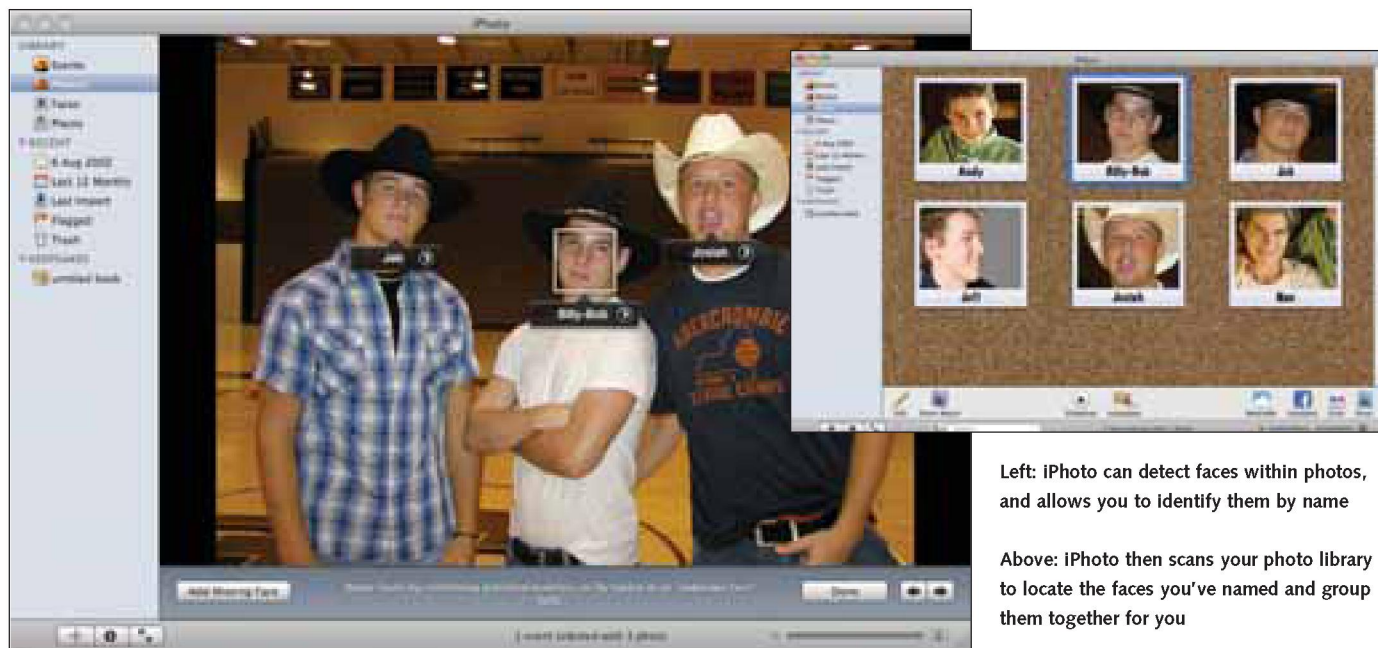
Contact Skype www.skype.com

System requirements 1GHz processor • 256MB Ram • 22MB hard disk space • Internet connection • Windows XP/Vista

MAC SOFTWARE

Apple iLife 09

An impressive upgrade for users of iPhoto, iMovie and Garageband



Left: iPhoto can detect faces within photos, and allows you to identify them by name

Above: iPhoto then scans your photo library to locate the faces you've named and group them together for you

Apple says that iPhoto is the flagship of its iLife suite, and it certainly gets a lot of attention in this latest upgrade. The iMovie video editor and Garageband music software get some welcome new features too.

The two big additions to iPhoto are 'Faces' and 'Places', which allow you to organise your photos using face recognition technology, or by linking photos to a specific location.

When you import a photo into iPhoto it scans the image to see if it can identify any of the faces featured. You can click the 'Name' button in the toolbar to add a name to a face. Once you've done this, iPhoto scans your photo library to see if it can recognise that person's face in other photos and gathers all the pictures of them under the 'Faces' heading in the Library panel on the left of the screen. Clicking on 'Faces' shows you all the people iPhoto has recognised, so you can quickly locate photos of individual people.

The face recognition works well, identifying a large number of photos in our library after we had labelled just a handful. It has limitations though, the main one being that it needs a good frontal view of a person's face to identify them accurately. Profile shots are hard to identify, so you may have to label these yourself.

Alternatively, you can use the 'Places' option to organise photos by location. If you've got a GPS-equipped camera then iPhoto can use the location data from the camera, or you can simply enter the location information yourself. The program can then create a map of the world that allows you to click on any location in order to view the photos you took there. We'd still recommend buying Photoshop Elements for editing work, but iPhoto certainly makes

it easy to organise large collections of photos so that you can quickly find the photos you want.

Many people will be more interested in the new version of iMovie. The last version wasn't an upgrade, it was a complete rewrite that managed to simplify certain editing features while throwing out a lot of features that people had come to take for granted. Thankfully, iMovie 09 restores a few of these. There's a new 'precision editor' that works more like the traditional timeline found in most video-editing programs, and new options for quickly combining clips, extracting the audio from one clip to use in another, and creating picture-in-picture effects. There's also a powerful new image stabilisation option that can eliminate the shaky movement of handheld camcorders, or footage that was shot on the move.

The other program that gets impressive new features is Garageband, Apple's easy-to-use music software. As well as some tidy new guitar amps and effects, Garageband 09 includes a series of tutorials that can help beginners learn to play keyboards or guitar. Another good feature for budding musicians is the 'jam' option that lets you practise by playing along to some ready-made tracks.

It's a shame iDVD and iWeb don't get much of an upgrade, but iPhoto, iMovie and Garageband certainly provide good value for money. Our only complaint is that the documentation is poor. Newcomers would benefit from a proper manual and tutorials rather than the motley collection of online Help files currently included with each program. Even so, iLife 09 is an impressive upgrade that is worth the money if you use any of the programs in the suite on a regular basis.

Cliff Joseph

Verdict

Pros Very good upgrades for iPhoto, iMovie and Garageband

Cons iDVD and iWeb are rather overlooked

Overall An impressive upgrade that combines powerful new features with Apple's traditional ease of use

Features ★★★★★

Ease of use ★★★★★

Value for money ★★★★★

Overall ★★★★★

Price £69, five-user family pack – £85

Contact Apple www.apple.com/uk

System requirements Mac with OSX v.10.5 • 1GHz processor (2GHz dual-core processor recommended) • 1GB Ram

ONLINE SECURITY

Sentry Parental Controls

A powerful, but complex, online security system



Once set up properly, Sentry Parental Controls turns out to be quite an impressive online protection system for your children.

You install the software by downloading it from the developer's website. Once that's done, an icon for the Sentry control panel appears in the Windows Taskbar. However, you configure and control the software by logging on to the Sentry website and using the browser-based controls on the website itself.

This is a clever idea, as it allows you to alter protection settings and monitor your child's online

activities even when you are away from home. As well as basic options, such as blocking unsuitable websites and monitoring chat sessions, you can view your child's computer screen remotely or set the software to send you an email alert or screenshot if it detects a violation of its security settings. You can even shut down the child's computer altogether.

From a technical point of view, this browser-based control system works well – but only if you're using a PC. The developers warn that the online controls don't work on a Mac, which is odd since a browser-based control system ought to be platform-independent. However, we tried to access the website controls using both Apple's Safari and the Firefox browser, to no avail.

The only real problem for PC users is that Sentry's documentation is so poor. There's no manual supplied with the software itself, merely a selection of help files on the website that unhelpfully list features in alphabetical order, rather than in a sensible linear sequence that would guide you through the initial configuration process. So while Sentry Parental Controls does provide very thorough protection for your children's online activities, the developers really need to tidy up their documentation in order to help less technically minded users.

Cliff Joseph

Verdict

Pros Browser-based controls provide remote monitoring of your child's PC

Cons Poor documentation; licence lasts for one year; no Mac support

Overall The browser-based control system is versatile and thorough, but the documentation is sub-standard

Features ★★★★★

Ease of use ★★★★★

Value for money ★★★★★

Overall ★★★★★

Price Single-user, one-year licence £29.99; 3-user, one-year licence £39.99

Contact

www.sentryparentalcontrols.co.uk

System requirements

PC with Windows XP or Vista • 1.7GHz

processor • 512MB Ram • 150MB

hard disk • Broadband connection

NINTENDO DS SOFTWARE

Nintendo 100 Classic Book Collection

Read books on your Nintendo DS



Harper Collins' 100 Classic Book Collection is the first commercial attempt at turning the Nintendo DS Lite into a mini ebook reader, and it almost works.

Using public-domain text versions of classic books is a favourite way of filling up ebook readers, and that's exactly what this title does. *Moby Dick*, *Little Women*, *Lord Jim* – they're all there.

The application uses the DS Lite's touchscreen and buttons for navigation, with a 'bookshelf' display of titled book spines that you can scroll through smoothly

or search by title, genre or length. You can also configure the application for left- or right-handed use.

Selecting a book brings up a menu from which you can read the text immediately or read information about the book or author. The text is surprisingly readable at the default font size, and there's a larger size available too. There's no choice of font type, so if you don't like the fusty-looking serif font, too bad.

But there are lots of neat touches in the interface design. You can use up to three bookmarks per book, plus you can skip directly to chapters or page numbers using the menu or a scroll bar. Several types of corny background music, as well as nature sound effects, can be chosen or, thankfully, turned off.

The most interesting feature is the use of the Nintendo Wifi Connection (WFC) to download additional free books. There's about 1MB of memory on the game card, which stores up to 10 books. A typical book (there are just 10 to choose from) took less than a minute to download. You can rank books and download user rankings, as well as send books wirelessly to another DS Lite.

It's a neat application, and the interface proves the DS Lite has potential as an ebook reader. It's just a pity there's no must-have content for it yet.

Kelvyn Taylor

Verdict

Pros Cheap; superb user interface; downloadable books

Cons Dull collection of books; limited additional titles

Overall This title proves that the Nintendo DS Lite has great potential as an ebook reader, but it needs some more compelling content to make it a real success

Features ★★★★★

Ease of use ★★★★★

Value for money ★★★★★

Overall ★★★★★

Price £19.99

Contact

www.nintendo.co.uk

System requirements

Nintendo DS Lite • 802.11b Wifi internet

connection required for Nintendo

WFC (only Wep encryption is

supported)

Personal Computer World

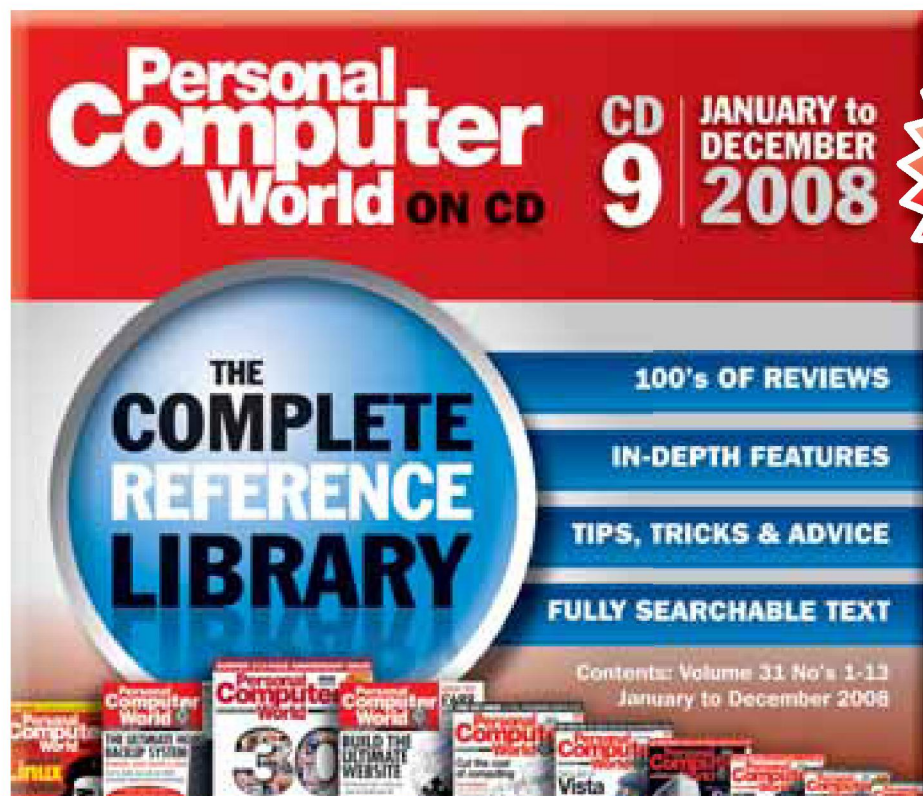
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FIRST-PERSON SHOOTER

F.E.A.R. 2: Project Origin

Incredibly scary with smooth gun-slinging action



Even when running on modest hardware, F.E.A.R. 2 looks as if it has been crafted by artists

There's one question you have to ask yourself when deciding if F.E.A.R. 2 is the game for you: "Do I like to be scared?" If you like horror films then F.E.A.R. 2 will definitely get your juices running – it's a scary game with an appropriate 18 rating.

One of the most harrowing sections happens during the first three hours, when mutated, semi-naked humans scuttle up like a spider and jump on you. Things are just as jumpy later in the game when you encounter mutants who can revive dead soldiers. It was so terrifying in these parts that we resorted to turning down the graphics, using speakers instead of headphones and playing during the daytime.

With the graphics turned up, the game looks crisp and detailed, even on modest hardware, and feels as if it has been crafted by artists, something also reflected in the delicately conducted audio that speeds up the tempo when you are pounced on.

F.E.A.R. 2: Project Origin picks up where the original F.E.A.R. (First Encounter Assault Recon) left off. You control a new character, Michael Becket, who loses consciousness during a massive explosion. Becket is operated on and given special 'slow-mo' powers which, just as in Max Payne, mean you can slow down time for more accurate shooting.

A naked psychic woman, called Alma, frightens you throughout the game from this point forward. As well as dealing with Alma and the monsters that she apparently controls, you have to battle your way through replica soldiers, who are controlled by telepathy, and government soldiers who are trying to destroy the replica ones.

F.E.A.R. 2 gets rid of the realism that has plagued recent games (which makes reloading, changing

weapons and running slower and jerkier) in favour of a smooth and accurate system of movement and shooting. The weaponry is well balanced, with an impressive selection of grenades. The flame thrower has a particularly fun twist compared with other incarnations because it shoots out single balls of fire, rather than a stream, to temporarily or permanently disorientate enemy soldiers.

The mech warrior section, where you climb inside a mechanical biped to mow down a bunch of soldiers, does offer some variety beyond the regular first-person action, but it doesn't fit well into such a linear game as F.E.A.R. 2.

That linearity means there is one route from A to B in every level, and only one way of dealing with each baddie. Linear gameplay does sometimes make you feel redundant, but F.E.A.R. 2 makes amends with its atmospheric storytelling.

Two bigger flaws are in the artificial intelligence and the text-based storytelling. First, the computer-controlled enemies can be woefully stupid, particularly when they run into a ladder, whereupon they'll get stuck running on the spot and stop firing at you. Second, much of the plot is explained through handheld ebooks scattered throughout the game. Reading the story is old-fashioned compared with the standard 3D cut-scene or radio storytelling we've come to expect. But what really bugs us is how confusing and irrelevant some of these ebook story bits are.

Ultimately though, if you like the horror genre and enjoy spending hours playing a game that reads like a book (literally, in places) then F.E.A.R. 2 does the job very well indeed.

Emil Larsen

Verdict

Overall Carefully crafted so that scares and thrills are blended with solid, if very linear, gun-toting action

Overall ★★★★★

Price £34.99

Contact Warner Bros Interactive Entertainment www.whatisfear.com

System requirements Intel Pentium 4 3.2GHz or AMD Athlon 64 3200+ • Nvidia Geforce 6800 or ATI Radeon X700 • 1GB Ram (1.5GB for Vista) • 12GB free disk space

COMPETITION

WIN! Two Zoom H4n and Two H2 Handy Recorders

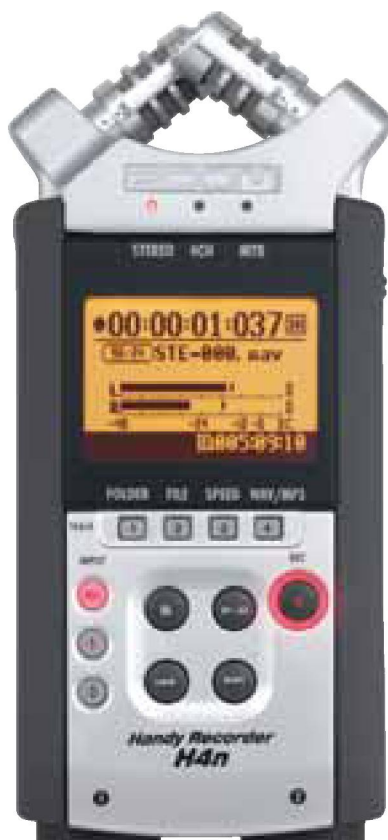
This month PCW has teamed up with audio recording specialist Zoom to offer you the chance of winning one of its latest handheld recording devices.

The ultraportable Zoom H2 is the perfect stereo recorder for podcasting or interviewing on the move. Recording music sessions or conferences, the H2 provides amazing recording quality. As a USB mic the H2 lets you record directly to your PC, making it ideal for budding musicians.

The new H4n offers integral X/Y stereo condenser microphones, a digitally controlled mic pre-amp and the ability to use both internal and external microphones simultaneously for four-channel recording. The Zoom H4n has superior, built-in X/Y stereo condenser microphones that allow variable recording patterns at either 90° or 120°. With a large 1.9in LCD screen, an intuitive interface and an onboard reference speaker, the H4n has incorporated several of the most popular features from the H2 such as Broadcast Wave Format (BWF) compatible time stamp and track marker functions. And the auto-record and pre-record features mean you will never miss a moment.

For musicians and songwriters, the H4n has a more user-friendly multi-track recording capability along with Hi-Z Inputs for recording guitar and bass, variable speed playback capability for 'phrase training', onboard studio effects and more than 50 different guitar and bass amp modelling settings.

A new stamina mode enables the H4n to operate continuously for 10 hours on a single set of AA batteries. The H4n is also robust, with a rubberised, shock-resistant body for improved chassis protection, all-metal microphone design and a built-in mounting joint for tripod and microphone stand use. The H4n will record in high-resolution audio at 24bit/96KHz on SD/SDHC media of up to 32GB and comes with a 1GB SD card, wind screen, mic clip adapter, AC adapter, USB cable, protective case and Cubase LE recording software.



For musicians and songwriters, the H4n has a more user-friendly multi-track recording capability

We have two of the Zoom H4n Handy Recorders worth £330 each to give away as first prizes and two H2 Handy Recorders worth £180 each for the runners-up.

For more information on the range from Zoom visit www.zoom.co.jp.

For your chance to win, answer the question below and enter online at www.pcw.co.uk/competitions.

This competition opens on 21 March and closes on 17 April 2009.

How large is the Zoom H4n's LCD screen?

- a) 1.9 inches
- b) 2.9 inches
- c) 2.1 inches

This competition is open to readers of PCW, except for employees (and their families) of Incisive Media, and Zoom. PCW is the sole judge of the competition and the Editor's choice is final. Offer applies to residents of the UK and the Irish Republic only. Entrants must be over the age of 18 and only one entry per household will be accepted. Winners will be selected at random from all correct entries received. No cash alternative is available in lieu of prizes. Incisive Media will use all reasonable endeavours to notify the winner(s) within 14 days of the close of the competition. Incisive Media reserves the right to substitute the prize for one of greater or equal value if circumstances make this unavoidable. Prizes will be dispatched by the competition sponsor(s) and the winner(s) name(s) and address(es) will be provided to the competition sponsor(s) for this purpose. No purchase of the magazine is necessary to enter the competition. Incisive Media will use all reasonable efforts to ensure that the prizes are as described on this page. However, Incisive Media cannot accept any liability in respect of any prize, and any queries regarding a prize should be taken up directly with the sponsor of that prize.

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Best Buys

Your one-stop guide to the best-value products reviewed by PCW



With countless products available, shopping around for a new PC, peripheral or software package isn't an easy task, but with our Best Buys guide, you can make a quick purchase with confidence. We've split our Best Buys into 40 of the most popular categories, covering everything from desktop and notebook PCs right through to digital cameras and software.

Every month we'll update our Best Buys to include our most recent reviews and check the current pricing, although that's not to say you won't find a bargain online (try our price comparison site at

www.pcw.co.uk/bestprices). You'll also find the date of the magazine in which the product was first reviewed, along with an alternative suggested product for that category. If the Best Buy entry has a web code listed alongside it, this means you can read the full product review on our website. Simply head online and use the format [www.pcw.co.uk/\[web code\]](http://www.pcw.co.uk/[web code]) – for example, www.pcw.co.uk/2208243.

Each Best Buy product has gone through our rigorous testing and reviewing procedures, making this your one-stop guide to the best products on the market.

BUDGET PC



Zoostorm 3364-2354

Price: £499

Reviewed: July 2008

www.pcnextday.co.uk

Web code: N/A

This PC comes with a quad-core Intel Q6600 processor, 2GB of Ram, a 250GB hard disk and a 19in TFT. The only downside is the integrated graphics, but with expansion opportunities inside the case, this can be rectified.

HIGH-END PC

PC Specialist Fusion 4870X2

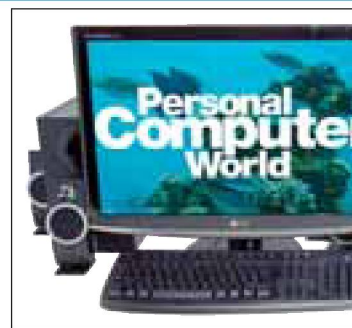
Price: £1,499

Reviewed: December 2008

www.pcspecialist.co.uk

Web code: N/A

A rare AMD-based system, this PC is perfect for high-end gaming and video editing. It features a dual-core 4870X2 graphics card, X4 9950 quad-core CPU and 8GB of Ram. You also get a decent 24in TFT.



ALTERNATIVE

Chillblast Fusion Sentinel

£699 www.chillblast.com Web code: 2211955

A well-built, quiet PC with a quad-core processor, good all-round performance and space inside for future upgrades. It also features a Geforce 8800GT graphics card.

ALTERNATIVE

Wired2Fire Diablo Extreme

£3,299 www.wired2fire.co.uk Web code: N/A

A fast and well-featured machine based on the new Core i7 architecture. It's relatively quiet with plenty of future-proofing.

BUDGET NOTEBOOK



Samsung Q210

Price: £675.98

Reviewed: November 2008

www.samsung.com/uk

Web code: N/A

It's not suited to gaming, but this notebook has all the benefits of Intel's latest Centrino 2 platform. Powered by a T8400 Core 2 Duo processor clocked at 2.26GHz, it's a stylish workhorse computer.

HIGH-END NOTEBOOK

HP Pavilion dv7-1000ea

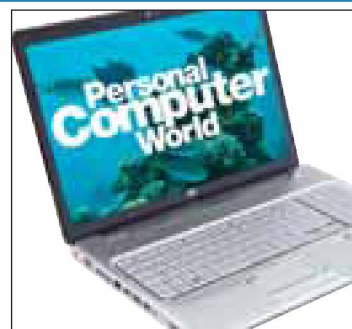
Price: £899

Reviewed: December 2008

www.hp.com/uk

Web code: N/A

Based on Intel's Centrino 2 platform, this notebook combines stylish design with high-end performance. It also has a Blu-ray reader and a crystal-clear 17in display. It's heavy, but as a desktop replacement it's perfect.



ALTERNATIVE

Hi-Grade D7000SRL

£499 www.hi-grade.com Web code: N/A

With a stylish chassis, decent performance, Bluetooth and HDMI, you get a lot for your money with this 15.4in notebook.

ALTERNATIVE

Acer Aspire 8920G

£1,289.99 www.acer.com Web code: N/A

Thanks to a recent price drop, this 18.4in notebook is now even better value for money. Highlights include a 2.5GHz processor and Blu-ray drive.

WINDOWS HOME SERVER



Fujitsu Siemens Scaleo 1900

Price: £469

Reviewed: July 2008

www.fujitsu-siemens.co.uk

Web code: N/A

It might not be the most attractive piece of computer kit, but this Windows Home Server from Fujitsu Siemens has good read-and-write performance and comes with some useful added extras.

ALTERNATIVE

Belinea 0.center

£386.58 www.belinea.com Web code: N/A

With a striking design and solid performance, the 0.center is a great little Windows Home Server with easy hard-disk access and good diagnostic tools.

ULTRA-MOBILE PC

MSI Wind

Price: £336.05

Reviewed: Christmas 2008

www.msicomputer.com

Web code: N/A

This netbook offers good battery life and a larger screen than many other models. With 1GB of memory and a 160GB hard drive, the MSI Wind is well specced all round and represents great value.



ALTERNATIVE

Acer Aspire One

£200 www.acer.co.uk Web code: 2220487

This portable notebook combines a decent keyboard, clever storage system and a great design. Its Intel Atom processor runs at 1.6GHz, backed up by 512MB of Ram.

BUDGET GRAPHICS CARD



Palit GeForce 9600GT 512MB Sonic

Price: £121.32

Reviewed: June 2008

www.palit.biz

Web code: N/A

The G94 GPU used by this card is basically a cut-down version of the G92 8800 and GTS cards, but with fewer, yet faster-clocked, stream processors.

ALTERNATIVE

Asus EAH2400Pro

£32.89 <http://uk.asus.com> Web code: N/A

This card features low power consumption and, although not as fast as the Radeon HD 2400 Pro cards, it's cheap and has some impressive video capabilities.

HIGH-END GRAPHICS CARD

Sapphire Radeon HD4870

Price: £181.76

Reviewed: October 2008

www.sapphiretech.com

Web code: 22233563

A fast card at a great price. To give an idea of the rendering potential of this card, it managed 46 frames per second with 4x anti-aliasing and 4x antroscopic filtering turned on at 1,280x1,024 resolution.



ALTERNATIVE

Zotac GeForce GTX 280 AMP Edition

£366.27 www.zotac.com Web code: 2223078

Zotac's version of the GTX 280 is the fastest single-core graphics card we've tested. The board also supports Nvidia's Hybrid Power technology.

TFT (17-22IN)



Philips 220WS8

Price: £189

Reviewed: February 2008

www.philips.co.uk

Web code: N/A

This 22in TFT screen has superb image quality, is evenly lit and with a power draw of just 35W is also extremely efficient. The icing on the cake is Philips' excellent pixel policy. A great buy.

ALTERNATIVE

Viewsonic VX2255

£259 www.viewsoniceurope.com Web code: N/A

The VX2255's clear and excellent pixel policy, along with its multimedia features, make it great value at £259, despite the distinctly average image quality.

TFT (24IN+)

Philips 240BW8

Price: £309.95

Reviewed: September 2008

www.consumer.philips.com

Web code: N/A

This 24in screen has a professional feel and is well suited to any application where you need to be sure that your on-screen colours are accurate. It also comes at a good price and features HDCP support.



ALTERNATIVE

Iiyama B2403WS

£299.60 www.iiyama.co.uk Web code: N/A

The 24in B2403WS from Iiyama offers a good balance of performance and features, and is suitable for a wide range of uses.

SMARTPHONE



Apple iPhone 3G

£ from free

Reviewed: December 2008

www.apple.com/uk

Web code: N/A

It might not have as many features as some of its rivals, but the iPhone benefits from outstanding ease of use, a superbly stylish design, 3G (new to this version) and an online applications store.

ALTERNATIVE

RIM Blackberry Bold

£ from free <http://eu.blackberry.com> Web code: N/A

Once the sole domain of business users, the Blackberry now features a similar level of consumer features as high-street phones.

SAT NAV

Tomtom Go 720

Price: £309

Reviewed: February 2008

www.tomtom.com

Web code: N/A

You're paying a bit more than you might for a number of perfectly capable rivals, but you get so much for your money with the Tomtom Go 720, including a customisable display and great performance on the road.



ALTERNATIVE

Mio 620t

£269 www.mio-tech.be Web code: N/A

Mio's new software is impressive and, considering the range of features, it's priced competitively. The maps look great and performance is equally good.

DIGITAL CAMCORDER



Canon HV30

Price: £700

Reviewed: November 2008

www.canon.co.uk

Web code: N/A

With fantastic picture quality, this camcorder is the one to buy if you're looking to make the most out of your HD television. It also has a great selection of manual controls and lets you edit your footage.

ALTERNATIVE

Panasonic HDC-SD9EB

£450 www.panasonic.co.uk Web code: N/A

Able to capture decent HD footage yet remaining light, portable and cheap, this Panasonic camcorder is a great buy for those on a budget.

DIGITAL CAMERA

Samsung NV24HD

Price: £249

Reviewed: October 2008

www.samsungcamera.com

Web code: N/A

With excellent build quality, a 10.2-megapixel CCD and wide-angle 24mm lens, this digital camera is perfect for taking detailed outdoor shots. It also features 720p movie recording, so you can capture video in high definition.



ALTERNATIVE

Pentax Optio A40

£219 www.pentax.co.uk Web code: N/A

This 12-megapixel compact camera houses some great features, not least of which is the excellent image stabiliser. It also shoots great photos.

PORTABLE MEDIA PLAYER



Apple iPod Nano

Price: £109

Reviewed: December 2008

www.apple.com/uk

Web code: N/A

Stylish and thinner than ever before, the new iPod Nano features motion sensors, allowing it to detect whether you're holding it in portrait or landscape mode, and a quick shake activates the shuffle mode.

ALTERNATIVE

Sony NWZ-A815

£89 www.sony.co.uk Web code: 2203060

It might lack some of the extra features found on rival players, but this Sony model excels in terms of audio quality and is easy to navigate.

MEDIA STREAMER

D-Link DSM-330

Price: £135

Reviewed: October 2008

www.dlink.co.uk

Web code: N/A

With its excellent usability and simple setup procedure, this device makes sharing your media collection simple. It features an HDMI port, can output 720p video and performs extremely well.



ALTERNATIVE

Archos TV+

£249 www.archos.co.uk Web code: 2210545

With a 250GB hard disk, this device not only streams media across a network, but can also store your entire video, music and photo collection locally.

LASER PRINTER



Brother HL-2170W

Price: £149

Reviewed: March 2008

www.brother.co.uk

Web code: 2207225

If you're looking for a good-quality monochrome laser printer for general home use, this Brother model is definitely worth considering. It's fast, compact and even has a wireless adapter. A bargain at this price.

ALTERNATIVE

Lexmark X500n

£301 www.lexmark.co.uk Web code: N/A

An amazingly good-value laser printer, considering it's not only colour but also includes a scanner, allowing you to scan, copy and print at speed.

PHOTO PRINTER

Canon Selphy CP750

Price: £110

Reviewed: October 2007

www.canon.co.uk

Web code: 2193769

It's a little bulky when in use, but this dedicated photo printer can produce high-quality prints in under 70 seconds. And a 2.4in display allows you to perform basic image editing before printing.



ALTERNATIVE

Sony DPP-FP90

£150 www.sony.co.uk Web code: 2196751

It's not particularly cheap to run, but this printer produces high-quality photos from a variety of sources and is reasonably fast as well.

MULTIFUNCTION PRINTER



Canon Pixma MP610

Price: £139

Reviewed: November 2008

www.canon.co.uk

Web code: N/A

Canon's compact and stylish MFD has a decent mix of top-notch quality and fast printing and can also print directly to DVDs. Running costs are relatively low, which is surprising given the low price tag.

ALTERNATIVE

HP Photosmart C8180

£298.45 www.hp.com/uk Web code: N/A

An expensive, but hugely impressive MFD, the Photosmart C8180 is packed full of useful features and is also incredibly easy to use.

NETWORK-ATTACHED STORAGE

Netgear Readynas Duo RND2150

Price: £279.99

Reviewed: May 2009

www.netgear.co.uk

Web code: N/A

This Nas device has excellent power management, a scheduled on/off facility and top-notch PS3 and Xbox 360 playback. The price is brilliant and includes a three-year warranty.



ALTERNATIVE

Acer Aspire Easystore

£499 www.acer.co.uk Web code: 2206105

This Nas device features 2TB of storage (other sizes are available), along with wireless, so you can place it anywhere in your home.

POWERLINE NETWORKING



Solwise NET-PL-200AV Push

Price: £50

Reviewed: March 2008

www.solwise.co.uk

Web code: 2207035

You'll need at least two of these to get your powerline network running, but they're the best around. Based on the Homeplug AV standard, they're fast, resilient to electrical noise and great value for money.

ALTERNATIVE

Devolo Dlan 200 AV

£149 www.devolo.co.uk Web code: N/A

Small and well designed, these Devolo powerline devices use the Homeplug AV standard and have pre-programmed quality of service rules built in.

WIRELESS ROUTER

Belkin N+ Modem Router

Price: £100

Reviewed: May 2009

www.catalog.belkin.com

Web code: N/A

Excellent performance and features make this router a compelling purchase, though it may be a little large if your needs are basic. It has a strong feature set and the configuration software is easy to use.



ALTERNATIVE

Solwise Engenius Wireless-N Gigabit Router

£120 www.solwise.co.uk Web code: N/A

It might be a little pricey, but this router performed well in our tests and comes complete with some advanced network filtering tools.

EXTERNAL HARD DISK



CMS V2ABS-CE-120

Price: £175

Reviewed: Christmas 2007

www.cmsproducts.com

Web code: 2202396

A portable USB2 external hard disk that weighs a mere 150g and comes with built-in 256-bit AES encryption. Inside the case sits a 2.5in 120GB 5,400rpm SATA notebook hard disk.

ALTERNATIVE

Western Digital Mybook Studio

£204 www.westerndigital.com Web code: 2206075

This stylish 1TB external disk comes with USB2, Firewire 800/400 and eSata interfaces for ultimate flexibility.

INTERNAL HARD DISK



Western Digital WD10EACS

Price: £185

Reviewed: January 2008

www.westerndigital.com

Web code: 2203061

This disk features four 250GB platters to provide 1TB of storage. It includes some advanced technology such as Intelliseek, which calculates optimum seek speeds to lower noise, vibration and power usage.

ALTERNATIVE

Toshiba MK2035GSS

£79 www.toshiba.co.uk Web code: 2203064

Weighing just 98g, this 200GB 2.5in SATA hard disk is perfect for increasing the storage capacity of your notebook.

AMD MOTHERBOARD



Gigabyte GA-MA78GM-S2H

Price: £60

Reviewed: June 2008

www.giga-byte.co.uk

Web code: N/A

With a wide range of ports, including eSata, and a good selection of options in the Bios, this is a great AMD board. Finally, after two years of losing to Intel, AMD's engineers have a winner on their hands.

ALTERNATIVE

EQS AB1S-RS690MKM

£46 www.eqsc Computers.com Web code: 2204803

The cramped design limits upgrade potential, but it's a keenly priced AMD motherboard that features an on-board HDMI port for HD video.

INTEL MOTHERBOARD



Asus P5E-VM HDMI

Price: £81

Reviewed: June 2008

<http://uk.asus.com>

Web code: N/A

This board has a great range of features. With the integrated graphics enabled, we comfortably overclocked it to 3GHz with our 2.4GHz Core 2 Quad Q6600 attached, so enthusiasts should take note of its capabilities.

ALTERNATIVE

Gigabyte GA-G31MX-S2

£53 www.giga-byte.com Web code: 2202711

Considering the price, you get plenty of features on this Intel board, including Intel's G31 Express chipset and ICH7 Southbridge.

PC CASE



Zalman GS1000

£110.62

Reviewed: April 2009

www.quietpc.com

Web code: N/A

With superb build quality and design throughout, together with a very reasonable price tag, Zalman's GS1000 is an ideal case for the gamer or to build a workstation into.

ALTERNATIVE

Akasa Omega

£139.81 www.akasa.co.uk Web code: N/A

Excellent build quality and some interesting design features make this a great case for those who are often changing components.

POWER SUPPLY



Akasa Powermax 1000

Price: £135.11

Reviewed: March 2008

www.akasa.co.uk

Web code: 2207736

This 1,000W power supply has two +12V rails and its single 135mm dual-ball-bearing fan makes it a lot quieter than you would expect. It also comes with a variety of power connectors.

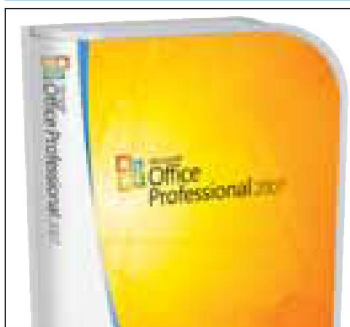
ALTERNATIVE

Enermax Galaxy 1000W

£233.83 www.enermax.com.tw Web code: 2164011

The 1,000W Enermax Galaxy power supply will suit those with SLI graphics and other power-sapping components, but it comes at a fairly high price.

OFFICE SUITE



Microsoft Office 2007

Price: £357

Reviewed: May 2007

www.microsoft.com

Web code: 2183475

The new interface to Office is something you'll either like or loathe. We like it, but upgrading comes at a price, both in cash and in effort. Despite this, it's still the leader in office productivity software.

ALTERNATIVE

Corel Wordperfect X3

£276 www.corel.co.uk Web code: 2149856

This latest version of Corel's office suite includes tools such as PDF exporting, along with improved compatibility with other office applications.

SYSTEM UTILITY

Acronis True Image 11

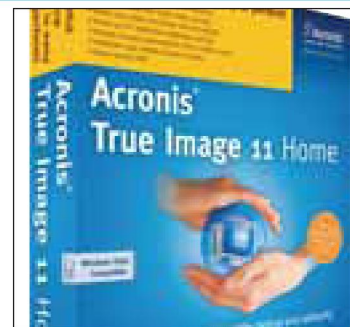
Price: £39.99

Reviewed: April 2008

www.acronis.co.uk

Web code: 2208669

True Image 11 is an excellent backup and recovery solution that offers an unprecedented level of control over disk cloning, scheduled backups and secure file deletion. Despite the range of features, it's easy to use.



ALTERNATIVE

Paragon Hard Disk Manager

£29.99 www.paragon-software.com Web code: 2205339

A comprehensive, all-in-one suite of hard-disk maintenance and backup tools that's easy to get to grips with and comes at a good price.

IMAGE EDITING



Adobe Photoshop Elements 7

Price: £76.38

Reviewed: December 2008

www.adobe.co.uk

Web code: N/A

Some of its advanced tools and special effects might not be required by most amateur photographers, but Adobe Photoshop Elements remains the standard that rival image editors must compete against.

ALTERNATIVE

Corel Paint Shop Pro X2

£79 www.corel.com Web code: N/A

A little more expensive than its main rival, Photoshop Elements, but Paint Shop Pro X2 excels in terms of ease of use.

VIDEO EDITING

Adobe Premiere Elements 7

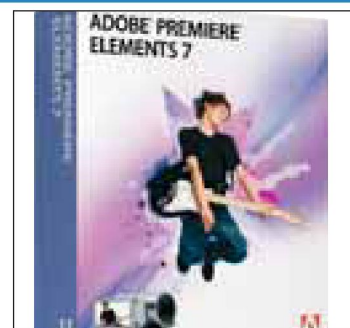
Price: £74.75

Reviewed: March 2009

www.adobe.co.uk

Web code: N/A

With an unbeatable combination of fun and easy-to-use features, including support for HD cameras and Blu-ray burning, together with accessible professional tools, this is an ideal tool for users at all levels.



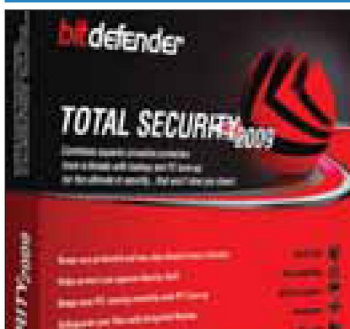
ALTERNATIVE

Muvve Reveal

£53 www.muvve.com Web code: N/A

If you're more interested in simply getting good results than in opportunities to tinker, this is an ideal package for home video editing.

PC SECURITY



Bitdefender Total Security 2009

Price: £44.95

Reviewed: January 2009

www.bitdefender.com

Web code: N/A

A comprehensive suite that's easy to use, and has fast scan times and low system overheads. With extra tools including backup and parental controls, this is a good all-rounder.

ALTERNATIVE

Kaspersky Internet Security 2009

£39.99 www.kaspersky.com Web code: N/A

An excellent security suite with top-class anti-virus protection and one-click problem solving.

WEB DESIGN

Adobe Dreamweaver CS3

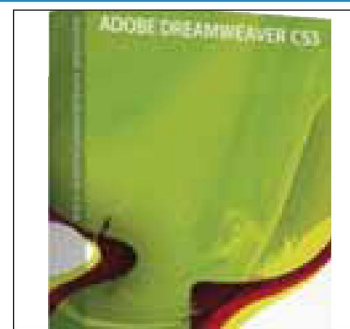
Price: £393

Reviewed: July 2007

www.adobe.com

Web code: 2186591

Powerful HTML coding and design tools along with CSS templates and Ajax widgets will help non-programmers get started. There's also a big emphasis on CSS, including a CSS Advisor tool for newcomers.



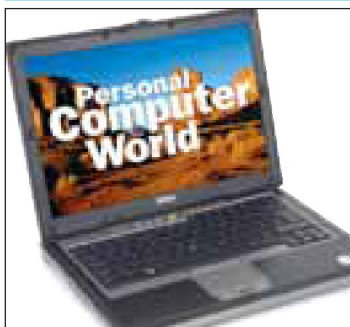
ALTERNATIVE

Microsoft Expression Web

£260 www.microsoft.com Web code: 2185242

Expression Web is a very good web-editing suite and features CSS support and a powerful interface, if you accept the inevitable Microsoft bias.

BUSINESS PC



Dell Latitude D531

Price: £586

Reviewed: October 2007

www.dell.com

Web code: N/A

With a dual-core AMD Turion processor clocked at 1.8GHz, 2GB of Ram and Vista Business, this is a good budget model. It also features a built-in DVD writer, 120GB Sata hard disk and both Wifi and Bluetooth.

ALTERNATIVE

HP Compaq dc7800

£598 www.hp.co.uk Web code: 2207533

The space-saving design of this affordable business desktop is very compelling and it can attach directly to an optional HP TFT screen.

BUSINESS PRINTER

HP Laserjet P1505n

Price: £205.63

Reviewed: June 2008

www.hp.com

Web code: N/A

Compact, stylish and quick, this Laserjet from HP is a very capable small-business printer and is stunningly good value to boot. It also features an integrated network interface.



ALTERNATIVE

Zebra P100i

£1,245.50 www.zebracard.com Web code: 2212221

A great device for small businesses needing to print plastic cards in volume. It takes up little desk space and can print in full colour.

NETWORK SECURITY



Smoothwall Smoothguard 1000-UTM

Price: £3,231.25

Reviewed: September 2007

www.smoothwall.net

Web code: 2194393

A comprehensive array of security tools, load balancing and failover facilities, plus extensive reporting options, mean this network security device justifies the high price.

ALTERNATIVE

Webroot Antispyware Corporate

£22.56 www.webroot.com Web code: N/A

This is the per-seat price for a one-year licence, which is great value. It also covers two key client security bases in one go.

NETWORK MANAGEMENT

VMware Thinapp 4.0

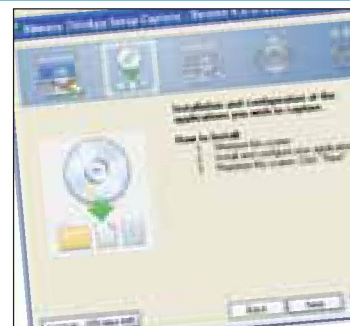
Price: £2,937.50

Reviewed: November 2008

www.vmware.com

Web code: N/A

Although its cost may be an issue for small businesses, Thinapp overcomes many of the issues associated with deploying and managing applications. It features on-demand streaming, USB key deployment and more.



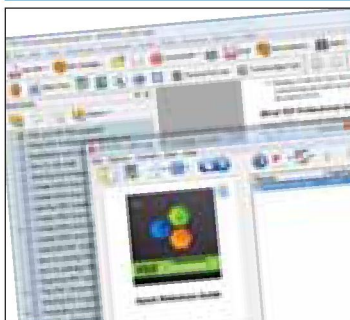
ALTERNATIVE

Prefix IT PrefixNE

Up to £2.94 per PC per month www.prefixit.com Web code: 2205651

Easy to install and use, this network management application allows you to keep track of all the kit on your network and is perfect for small businesses.

COLLABORATION SOFTWARE



Nuance PDF Converter Professional 5

Price: £99

Reviewed: June 2008

www.nuance.co.uk

Web code: N/A

It may often take second billing to Adobe Acrobat, but this latest release is cheaper and just as good – if not better. The only problem is there are so many new tools to learn.

ALTERNATIVE

C2C Archive One Policy Manager

£40 www.c2c.com Web code: 2212370

This is a well-conceived and easy-to-implement exchange storage management tool that can enhance performance and even reduce costs.

BUSINESS ACCOUNTS SOFTWARE

Microsoft Accounting 2008

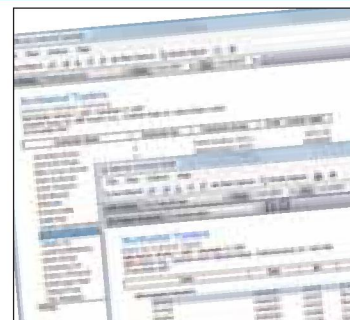
Price: £149

Reviewed: February 2008

www.samsung.co.uk

Web code: 2207529

A late entrant to the UK accounting market, Office Accounting 2008 is easy to use, feature-rich and will shake up the competition. It also offers in-depth integration with Outlook 2007 Business Contact Manager.



ALTERNATIVE

Intuit Quickbooks Pro 2008

£299 www.quickbooks.co.uk Web code: 2203178

A sensible update to what is one of the most accessible and easy-to-master small-business accounting packages around. Syncs with Outlook.

Performance testing is an important part of *PCW's* reviewing process, and to obtain our authoritative results we use the UK's best PC testing resource. Here we explain why you can trust our results and give you a tour of our most frequently used benchmark programs

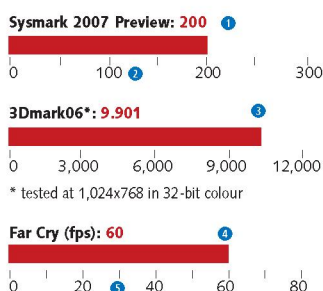
- Adobe After Effects 7
- Adobe Photoshop CS2
- Macromedia Flash 8
- Microsoft Outlook 2003
- Microsoft Word 2003
- Microsoft Windows Media Encoder 9 series
- Adobe Illustrator CS2
- Autodesk 3ds Max 8
- Microsoft Excel 2003
- Microsoft Powerpoint 2003
- Microsoft Project 2003
- Sketchup 5
- Sony Vegas 7
- Winzip 10

In PCW's labs, our staff have over 20 years of combined testing experience. We know all the perils and pitfalls of practical benchmarking, and we contribute to the development of industry-standard benchmarks through our full membership of Bapco (www.bapco.com), the non-profit benchmark consortium. Listed below are the main benchmarks we use for testing PC systems and components.

- **Bapco Sysmark 2007 Preview** – an application-based benchmark that tests real-world system performance.
- **Futuremark 3Dmark06** – the latest version of 3Dmark that tests DirectX 3D graphics performance.
- **Games** – we use built-in benchmarks in Far Cry and Fear to see how graphics cards perform in a real-world games.
- **Futuremark PCmark05** – a synthetic benchmark used to test the performance of a PC's major subsystems.
- **Test beds** – we use standardised AMD and Intel-based test rigs to test components and peripherals.



Performance



-
- BAPCO Preview - BAPCO 2007 Preview 1.00
- Waiting Test Results
- Select a test from the list to view the results
- Results_200706121230 - OffSession_3.pdf
- Test Summary
- Target Score: 100.00-12.00-100.00
- No. of Sessions: 1
- Scores
- | | Session 1 | Session 2 | Session 3 |
|------------------|-----------|-----------|-----------|
| 2. Learning | 85 | 84 | 88 |
| Critical Reading | 88 | 88 | 87 |
| Productivity | 71 | 72 | 72 |
| IQ | 85 | 75 | 75 |
- ST Mathlink 2007 Preview Rating: 4.7
- In order to publish test results, you must submit a Full Disclosure report (PDF) to BAPCO-support@bapco.com

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ON TEST

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D-Link DNS-323
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Lacie Internet Space
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- 87** Raidsonic Icy Box IB-NAS4220-B
Sony Vaio Home Server HS1
- 88** Synology Diskstation DS209+
Thecus M3800
- 89** Western Digital ShareSpace
Zyxel NSA-220
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Editor's Choice

'There are nearly two million PS3s in the UK, which will be crying out for a Nas drive'

Streaming servers

A Nas server can make streaming media easy. Emil Larsen reports

Network-attached storage (Nas) devices – small, dedicated servers that make it easy to share files between PCs at home – are increasingly popular, and media sharing is the sexy part of the modern Nas repertoire. Inbuilt FTP servers, print and email servers are all useful Nas features, but we cherish Nas drives the most when they serve videos, photos and music around the house. UPnP technology ensures media devices fit into a network and detect other devices, but here we're going to investigate products compatible with the Digital Living Network Alliance (DLNA) standard.

When something is DLNA certified, it guarantees compatibility with other DLNA devices. Certified Nas drives must be able to send music, videos and photos to other DLNA devices and software, such as AV receivers, digital photo frames and networked video recorders.

One of the most widely available DLNA media streamers is the Playstation 3, which supports a wide range of audio, photo and video formats. There are nearly two million PS3s in the UK, most of which will be crying out for a Nas drive to complement them, so one of our first tests was to play back standard and high-definition videos on a PS3 from a Nas.

Even though it's not DLNA certified, we tested the Nas drives with an Xbox 360 too, which is particularly relevant because there are 1.4 million more Xbox 360s than PS3s in the UK.

We also tested how easy these Nas drives are to set up for media streaming, what their power consumption and file transfer performance is like and what backup features they offer.

So, if you're after extra storage for your home network and the ability to share media around the home easily, read on.



Cisco Linksys Media Hub NMH305

Price £269.99 Contact Cisco 0800 026 1418 www.linksysbycisco.com



The latest Nas from Cisco-owned Linksys is specifically media focused. It ticks our main criteria of being DLNA enabled, so it streamed high-definition movies to a Playstation 3 with no problems (although fast forwarding HD content was a struggle), but it lacks fancier Nas features like Bittorrent downloading and a print server.

We tested the NMH305, the entry-level model, which lacks the multi-format card reader and front LCD

screen of its expensive siblings. Two USB ports are included though, with a backup mode that will copy files from a USB device onto the Nas.

Its web interface page is rather unique among the Nas boxes, as it lets you watch and listen to your media directly from a browser.

However, the media-rich web interface makes it sluggish to navigate and the formatting prevents scrolling up and down (you must click and drag instead).

The enclosure itself is attractive and has a unique drive setup too. Hard drives drop in vertically from the top on two smooth rails. There's space for two, with one frugal 500GB Western Digital AV-GP drive installed as standard. The AV-GP is specifically designed for personal video recorders (PVRs) and it helped the Media Hub achieve the best result in our load power test at just 11.1W. Scheduled on/off (a type of hibernation) isn't included though, so other units may have lower consumption over the course of a year.

Read performance was reasonable, but write speeds were below average at 11.3Mbytes/sec. This is around the limit of 100Mbytes/sec wired networks anyway, so the Media Hub will still outperform wireless networks.

The NMH305 is low powered and has good media support, including Xbox 360 media streaming, but for £10 more Netgear's Nas has far more features.

Verdict

Pros Very low power consumption; quiet; pleasant design

Cons No Bittorrent, scheduled hibernate or print server

Overall Easy to use and reasonable performance, just lacking a few of the features offered by others

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

D-Link DNS-323

Price £139.99 Contact D-link 020 8955 9000 www.dlink.co.uk



Since appearing in our August 2008 Nas group test, D-Link has developed new features for the DNS-323, including a Bittorrent client and jumbo Ethernet frame fine tuning.

We didn't enable jumbo frames (a feature of gigabit networking, where a larger packet of data is sent in one go to speed things up) on any of the Nas drives in this test, because performance can be affected and it requires more know-how.

The DNS-323 is a barebones enclosure with an excellent construction and easy disk installation. Just remove the plastic front panel, slide one or two disks in, then replace the panel. The drives lock into place, with two levers to pop them back out.

Raid 0/1 and JBOD (just a bunch of disks) modes are supported with average performance in both Raid modes, unsurprisingly dropping by 0.4-1.1Mbytes/sec when mirroring (Raid 1) was enabled.

It comes set up for DLNA streaming, coping well with an Xbox 360 and Playstation 3, but fast forwarding HD content on the PS3 was beyond the D-Link's capabilities.

Configuration is completed on a web interface, which presents you with one link to set Bittorrent and regular HTTP downloads going and another link to the main configuration pages.

The configuration pages include a temperature gauge and good hard drive power management puts hard drives to sleep after five minutes by default.

Some Nas devices didn't appear to spin-down hard drives properly, but the D-Link certainly did, bolstering excellent idle power consumption.

There's no support for USB hard drives but it is one of the quieter Nas boxes. With a recent price cut to £139.99, this is excellent value.



Verdict

Pros Easy to set up; low power consumption; sturdy construction

Cons Poor HD-fast forwarding; no external drive support

Overall A sturdy enclosure with good media capabilities at a bargain price

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Iomega Storcenter ix2

Price £317 Contact Iomega www.iomega-europe.com



We got off to a tremendously bad start with the Storcenter ix2. Our testing process always starts with a hard drive format and, at the moment, the Storcenter only provides a secure delete option. This took over 24 hours to complete and there was no way of avoiding it, even with restarts, once it had begun.

The noise made by the Storcenter left us with further bad impressions. The hard drive rattle coming

from the Storcenter competed with the Raidsonic Nas in drowning out the rest of the crowd.

On paper, the Storcenter has a lot going for it. 2TB for £317 is fantastic value and it's very compact.

Accessing the hard drives is difficult, though, and the configuration pages brought up a series of security warnings, overcome by adding certificate exceptions to our browser.

The interface is well laid out but lacks detail, especially when configuring the hard disks, as it's unclear whether you're getting Raid 0 or JBOD – it turns out Raid 0 is not supported by the Storcenter.

There's also no way to control when the hard disk spins down, it doesn't feature hibernate functions and write performance was poor.

Its DLNA credentials are fine though, producing smooth high-definition video streaming to a Playstation 3 (although fast forwarding was sluggish) and Xbox 360 media playback also worked a treat.

Bluetooth and video surveillance is available, if you buy a compatible dongle or IP camera, and upcoming firmware should include remote access and bittorrent functionality. Iomega hopes to make a non-secure format available too. Until then, the noise, slow write speeds and basic features make the Storcenter a disappointment.

Verdict

Pros Compact design; great value for 2TB drive

Cons Noisy; no hard drive power management; poor write performance

Overall It's too noisy and too slow to warrant a recommendation, even if 2TB for £300 appeals

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Lacie Internet Space

Price £184.99 Contact Lacie 020 7017 0040 www.lacie.com



Lacie's Internet Space is small and beautiful. We love its brick design and the blue light that reflects onto any surface it is placed on.

It's the smallest Nas here, but it's also one of the less capable drives, with no Bittorrent downloads or power management features. Instead you get some elaborate backup and remote access software.

Hipserv-branded software installs on your home PC to give it access to its configuration pages. Like all of

these Nas drives, the Internet Space appears in your network places, but files are also accessible via a browser once you've logged in to the Hipserv configuration pages. The upside is that you can link to Internet Space from any internet connection and access files stored on the Nas. The downside of linking the website and configuration pages is that it feels sluggish to navigate and if your internet connection goes dead, it's not easy to change the Internet Space's settings.

We found the backup software annoying, because it popped open console windows in Vista and became unresponsive when the Internet Space was turned off.

Read and write speeds were at the bottom of the group and, while load power draw was good, idle power consumption was average. We suspect it wasn't shutting down the hard drive properly.

Playstation 3 playback was good but, once again, it didn't deal with fast forwarding through HD content well. It took a while for the Xbox 360 to discover the Internet Space and it took several attempts to stream a video.

There's a distinct squeal of hard drive clicks that come from the Lacie Nas when it gets busy, so you will want it in a different room to the one you're watching films in and for that reason, it's only an average Nas box.

Verdict

Pros Small; attractive; remote file access included

Cons Annoying hard drive noise; intrusive backup software; slow

Overall There's a size/feature trade-off in the Internet Space, but its remote access functionality is very desirable

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Netgear Readynas Duo RND2150

Price £279.99 Contact Netgear 01344 458 200 www.netgear.co.uk



Netgear's Readynas Duo looks just like a real server, only scaled down like a toy car. It keeps many of the real server features such as hot-swappable disks, so you can remove the hard drives even when it's turned on.

After a making a frightening amount of noise starting up, the Readynas Duo quietened down to barely audible level. It's quite heavy for a two-drive Nas, with a robust swing-out door with magnetic latch

revealing both hard disk cages. As well as easy hard drive access, it also has the best configuration process of the group.

Once you've stepped over the curious flaw whereby you have to log in twice to configure it, you get to a superb interface with quick responses and bundles of features.

Scheduled on/off allows you to choose the days or times when it should turn itself off to conserve power (we measured a 0.5W power draw during its hibernation). Hard disk power management is good and the Readynas has lots of other server applications, including iTunes, FTP and printer servers. Linux users will be pleased with its NFS support for shared folders. It's easy to start Bittorrent and HTTP downloads on the Nas and it can also host your own website (although it takes a bit of persistence to do so).

DLNA functionality was excellent. It streamed high-definition content to a Playstation 3 well and even managed to fast forward through an 8.5GB video – something few other Nas boxes managed. Xbox 360 compatibility was good and read and write speeds were the best of the single drive Nas units here. You could buy a barebones Nas for around £190 if you want to buy a couple of drives separately to save cash. Either way you'll get an excellent three-year warranty.

Verdict

Pros Excellent power management and scheduled on/off; top-notch PS3 and Xbox 360 playback; very good interface

Cons None to speak of

Overall A mountain of useful features with excellent performance and a great price

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Qnap TS-209 II

Price £236 Contact Qnap www.qnap.com



Qnap has two versions of the TS-209 II, a pro and a non-pro. We tested the cheaper non-pro that excludes the NFS and Active Directory support which are useful for small businesses.

A Windows utility aids the TS-209 II setup – the web-based administration interface is not available until afterwards – and we were forced to select Raid 1 formatting after Raid 0 initially failed during setup.

A separate Qget widget installs and floats around

your desktop, allowing you to control HTTP and Bittorrent downloads to the Nas very easily.

Disk installation is simple, with metal caddies for the hard disks that slide in easily before you screw a flash front cover on. The hard drives are hot-swappable, but you have to remove four screws to access them.

The aluminium chassis is extremely well made and insulates the hard disks a bit, keeping noise to an absolute minimum. Most manufacturers keep their Nas tech specs secret but Qnap proudly boasts that this Nas houses a 500MHz Marvell processor and 256MB DDR2 Ram. This means it can host your own website with full PHP and MySQL functionality. Joomla is also preinstalled so you can get blogging immediately.

Write speeds were near the bottom of the group for multi-drive devices, but read speeds fared a bit better. Power consumption is great and kept energy draw at 9.1W when idling and 19.6W for intensive situations.

The TS-209 II was one of the few Nas boxes that could fast forward through high-definition content on a Playstation 3. And it breezed through our Xbox 360 test. A couple of flaws dent the Qnap's desirability. The web interface presents three different layouts, which is messy, and there's no scheduled on/off.

For the price, the barebones version of Netgear's Readynas Duo is a bit easier to use for home use.

Verdict

Pros Excellent build quality; quiet; excellent idle power consumption

Cons Below average write speeds

Overall Excellent construction, loads of website hosting features and good idle power consumption

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Raidsonic Icy Box IB-NAS4220-B

Price £114.99 **Contact** Raidsonic 0870 162 0818 www.nanopoint.co.uk



A DLNA-compatible Nas drive for around £100 sounds like a bargain, but in the case of the Icy Box IB-NAS4220-B, there's a catch. UPnP/DLNA media streaming is provided by Twonky Media's well-known software. Raidsonic has, however, only included a 30-day trial version, while the full version costs €30 (around £27). There is no backup software either, but backing up USB drives is easy.

While basic file sharing setup is quick and simple,

you have to get your hands dirty to install the Twonky Media server (manually copying it from CD to the server). Once that's done though, Playstation 3 playback works fine (apart from sluggish fast forwarding) and Xbox 360 playback works well too.

The Icy Box is imposing and long, but also compact, housing a very noisy fan at the back. Installing hard disks (there's space for two) requires a delicate touch as there are sharp metal edges to avoid and there are no drive rails to put the drives into place – you just have to tentatively line them up with the screw holes.

When we started testing the Icy Box we saw wild swings in our read and write speeds, often dipping to 0.4Mbytes/sec. We realised the Icy Box has compatibility issues with the D-Link DIR-855 router we were testing with, and with a new router in place, the Icy Box achieved some good read speeds and some average write speeds.

Router incompatibilities are compounded by reports that Samsung hard drives do not work in the IB-NAS4220-B, although Raidsonic and Samsung are releasing updates to fix these problems.

The Icy Box has lots of features and, if you're willing to get your hands dirty, it's a good-value buy. But you get what you pay for and we'd recommend spending £25 more on the D-Link DNS-323.

Verdict

Pros Affordable; Bittorrent, FTP and print server all included

Cons Difficult installation; DLNA and backup software costs extra; router and hard drive incompatibilities

Overall It's cheap but it's a hassle to set up and there are potential hardware conflicts to overcome

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Sony Vaio Home Server HS1

Price £489 **Contact** Sony 020 7365 2947 www.sonymstyle.co.uk



We discovered the awkward truth behind DLNA when testing Sony's Home Server HS1. DLNA only stipulates that devices support MPEG2 video, with MPEG4 and H.264 formats optional extras. Most videos are encoded in MPEG4 these days and our test included MPEG4s, motion JPEGs (common on digital cameras) and an H.264 high-definition movie. The Home Server HS1 refused to stream these files to the Playstation 3, only offering

the PS3 a selection of older MPEG1 and MPEG2 files. Worse still, it's not compatible with the Xbox 360.

Apparently Sony is discussing an update, but for now the HS1 is not a credible video Nas, which is a shame, as its design and connectivity are excellent.

The round case has a front-facing LCD that will display all sorts of information including its IP address, network name and the time. There are several USB ports, useful one-touch backup buttons and a slide-back cover protecting a multifunction card reader.

The web-based configuration doesn't really let you configure anything. It shows your basic sharing options and which DLNA applications are currently using it, but it won't show other important information such as hard drive configuration (no mention of Raid) or power management settings.

Some very basic backup software is included, but there's no iTunes, FTP or print server on board. There's also no Bittorrent or HTTP download client. The measly one-year warranty, very high power consumption and whopping £489 price all add further insult.

With iTunes and Bittorrent support and with broader video format support, so you can play back high-definition movies, this could undoubtedly be an award-winning Nas. But as it stands, it's the least capable Nas of the group and not a wise purchase.

Verdict

Pros Attractive; simple setup; excellent connectivity and front LCD

Cons Expensive; very poor video compatibility; no traditional Nas features

Overall With terrible video format support, no traditional Nas features and a high price, there's little to appeal here

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Synology Diskstation DS209+

Price £414 Contact Synology 01908 673 709 www.synology.com



The DS209+ has all the standard server types you'd expect from a Nas, as well as HTTPS for secure website hosting, encrypted network backup, NFS support and even support for USB speakers and external soundcards.

It is essentially a small-business server, with massive transfer speeds. On our gigabit network, where jumbo frames were disabled for ease of use, speeds were 36.8Mbytes/sec and 31.6Mbytes/sec respectively.

Since a 100Mbit network can only achieve 12.5Mbytes/sec, the DS209+ is overkill for most home networks.

An 800MHz processor with 512MB of Ram is the backbone behind these excellent results. DLNA media streaming was also perfect, whizzing through high-definition content on a PS3 with ease, and Xbox 360 playback worked too.

The chassis is a bit basic and hard drive installation isn't easy. You have to manually attach Sata and power cables and then screw each drive in. The setup process, performed in Windows, contains some badly written English and can be a bit daunting for novices, especially when it asks for a configuration file – a field you don't need to touch.

Configuring Raid is only covered by the web configuration pages and there is no explanation of the different types.

Apart from that, the configuration pages are exhaustive, containing everything from a temperature gauge (showing 40°) to scheduled on/off (we measured 0.5W in hibernation).

The DS209+ produces a lot of noise and has a high power consumption which, combined with the high price and huge range of business features, makes it less suitable for home use.

Verdict

Pros Very fast transfer speeds; massive feature set

Cons Expensive; other Nas boxes are quieter; potentially daunting setup

Overall An excellent small-business Nas, but not suited for home use

Features ★★★★★

Performance ★★★★★

Value for money ★★★☆☆

Overall ★★★★★

Thecus M3800

Price £549.99 Contact Thecus 0844 288 6868 www.originstore.com



The Thecus M3800 is a solidly built and quiet Nas with a very interesting front panel that shows its IP address, fan speed, temperature and the date and time.

The M3800 can also output directly to your TV via HDMI, composite and component connections (all cables included). And you can access media from there using a slimline remote control.

As a Nas, the M3800 excels in every area. Along

with standard server features it has an eSata connector, scheduled on/off (we measured 1.8W during this mode), a webcam server (to use with a USB webcam for security), three hot-swappable hard drive bays (so you can enable Raid 5) and two Ethernet ports. One can connect to an existing network, while the other can create new IP addresses, so you can set up a media network, using the inbuilt DHCP server.

File transfer speeds were outstanding, beating the Synology in read tests but losing to it in write tests. Playstation 3 media streaming was immaculate – even when fast forwarding high-definition content – but it couldn't stream to an Xbox 360.

Power draw was a little high, which we are happy to attribute to the TV functionality. We connected the M3800 directly to a 37in HDTV using an HDMI cable and, while standard-definition videos played back fine, a 1080p high-definition movie stuttered in this mode. The TV output interface is barren and even lacks timeline navigation when you're playing video. There's no support for .mkv files or .mpg extensions, which makes this a poor substitute for a dedicated multimedia player or media streamer.

On the one hand, the M3800 is a very convenient all-in-one device. But £550 is a lot for a TV-attached device that struggles with 1080p video.

Verdict

Pros Scheduled on/off; fast file transfers; Raid 5 support

Cons No Xbox 360 support; limited TV output

Overall An excellent Nas combined with a poor multimedia player

Features ★★★★★

Performance ★★★★★

Value for money ★★★☆☆

Overall ★★★★★

Western Digital Sharespace

Price £499.99 **Contact** Western Digital 01372 360 055 www.wdc.com



Western Digital's hard drives are popular in Nas boxes, particularly the low-power models with variable rotation speeds. So the company has cut out the middle man with its own Nas, the Sharespace. It's a business-oriented Nas with four hard drive bays (not hot-swappable), two of which were filled in our unit. With four drives in place you get Raid 5, which combines the speed of Raid 0 and the backup offered by Raid 1.

The backup software is limited to three PCs, while remote access is enabled by third-party Mionet software, which costs \$7.99 (around £5.55) per month. Both features feel a little restrictive compared to other Nas boxes.

Setup is simple and the interface is easy to use, with big dummy-proof icons for every feature. The automated firmware upgrade system is particularly easy to use.

Other notable features include two USB ports with a button to automatically transfer all the data on external drives to the internal disks.

Despite advertising the Sharespace as DLNA certified on its website, it could not stream media to our Playstation 3 or Xbox 360. Apparently DLNA-compatible firmware will be available to download by the time this issue hits the shelves.

Write speeds were average, only dropping from 15.7Mbytes/sec to 14.1Mbytes/sec when changing from Raid 0 to Raid 1. Read speeds were around 8Mbytes/sec better, while power consumption was also average.

Although you get a three-year warranty, Bittorrent support is lacking and so is scheduled on/off. We feel the Sharespace is a bland box with Synology and Thecus offering more comprehensive high-end devices.

Verdict

Pros Raid 5; space for four hard drives; good firmware updater

Cons No DLNA support yet; expensive

Overall A DLNA firmware update should correct many of its wrongs but, even then, the Sharespace is too pricey as a home-entertainment drive

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Zyxel NSA-220

Price £206.99 **Contact** Zyxel 01344 303 044 www.zyxel.co.uk



A cool all-white metal chassis covers Zyxel's NSA-220. It's all for show though, since what appears to be an LCD panel is, in fact, just decoration. Two front-facing USB ports sit below the fake LCD panel and can be used for external hard drives, but not for USB printers, as there's no print server onboard.

Disk installation is a doddle, since each drive has its own caddy. It's not the perfect screwless design such

as D-Link's DNS-323, but it's almost as quick. There are no rubber shock absorbers for the drives, which meant the NSA-220 wasn't as quiet as we had hoped.

The web interface is well designed with lots of little quirks to help you configure things. Every network share, for example, has its own icon and comes with a manage button that allows you to set privileges quickly without having to navigate to other pages.

The NSA-220 produced some of the slowest file transfer speeds we've seen, with particularly poor Raid 0 read speeds (the area where it should have done best), achieving just 4.8Mbytes/sec – less than half the average speed a 100Mbit home network is capable of. Power consumption was good though, especially idle consumption rates.

It passed our basic DLNA compatibility test, streaming basic media to a Playstation 3 with no problems. It failed to serve our high-definition movies though which, we believe is because the Zyxel is not compatible with the H.264 format.

It also failed to stream media to an Xbox 360, although Zyxel says its new model, the NSA-220Plus, coming in March will rectify that.

Zyxel has created a great-looking enclosure with a good web interface, but the D-Link DNS-323 is much better value.

Verdict

Pros Easy setup; good interface; great idle power draw

Cons No Xbox 360 support; poor high-definition video support; very poor transfer speeds

Overall Attractive and solid features, but the D-Link DNS-323 is cheaper and performs better

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

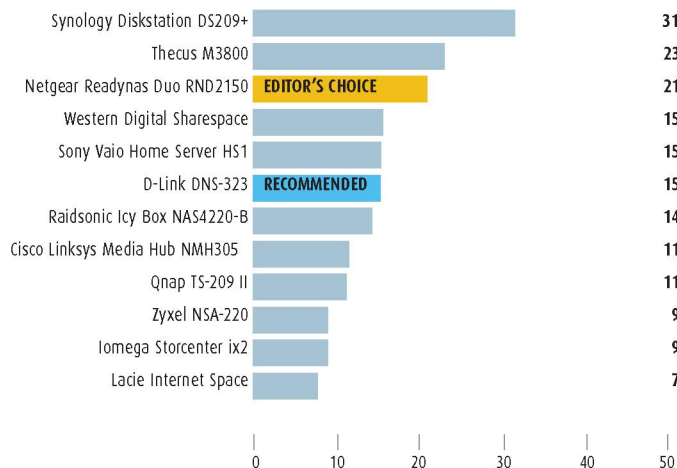
Overall ★★★★★

Lab results

Raid 0 performs better, but for security, Raid 1 is preferable

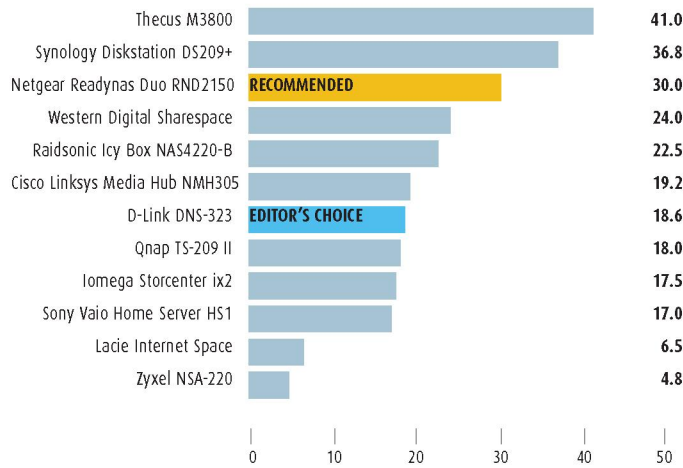
Write, Raid 0 where applicable (Mbytes/sec)

Bigger is better



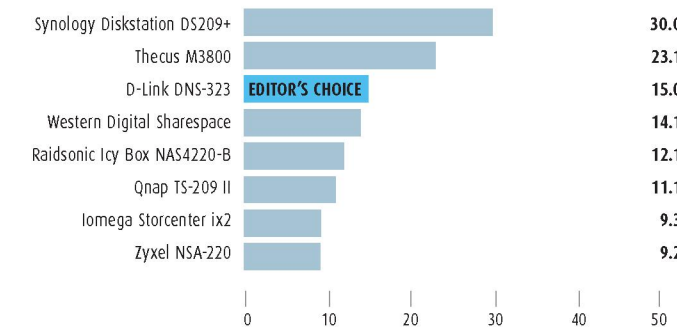
Read, Raid 0 where applicable (Mbytes/sec)

Bigger is better



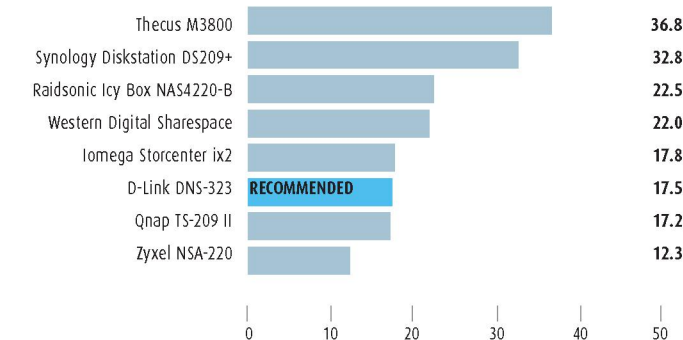
Write, Raid 1 (Mbytes/sec)

Bigger is better



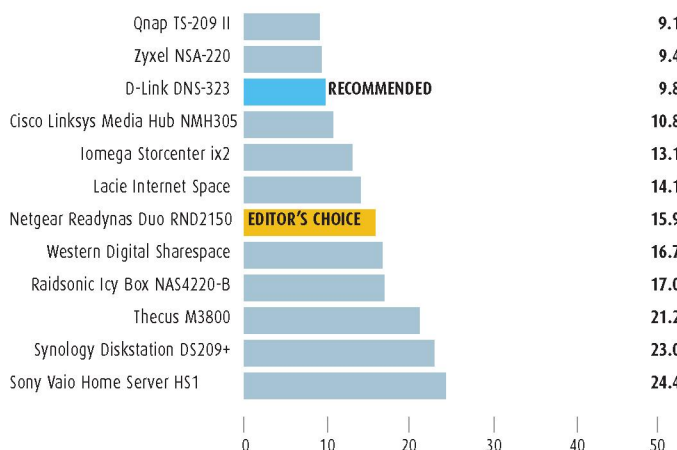
Read, Raid 1 (Mbytes/sec)

Bigger is better



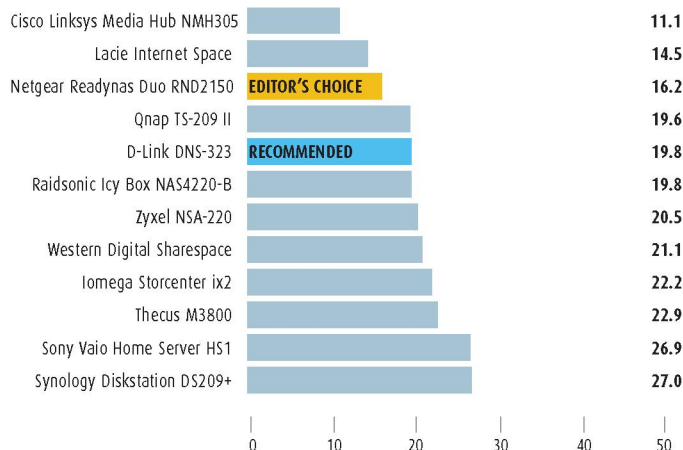
Idle power draw, Raid 1 where applicable (watts)

Smaller is better



Load power draw, Raid 1 where applicable (watts)

Smaller is better



Streaming on your network – inside the acronyms

With some Nas units boasting Universal Plug and Play (UPnP) streaming, and others DLNA, what's the real difference and what should you be looking for?

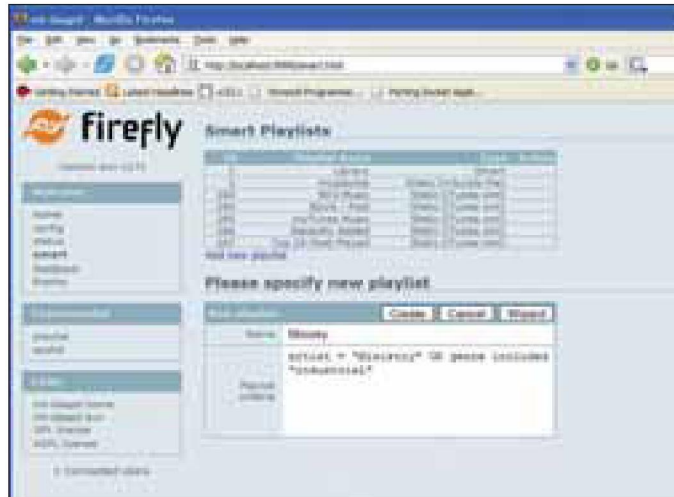
UPnP is a framework that ensures different devices can see and transfer files between themselves, while DLNA ensures they can understand the data that's being transmitted. DLNA was mostly born out of the fact that UPnP is almost too flexible a framework. To tighten things up a bit, DLNA imposes minimum requirements for devices, specifying which file formats they must understand.

The minimum requirements for DLNA certification are JPEG support for photos, LPCM (WAV) support for audio and MPEG2 support for video. That means many common audio formats, such as MP3 and AAC, and many video formats, such as MPEG4 and WMV, are optional. The DLNA team has identified that this is a deficiency in the standard and has promised to increase file type support across the board in the future. In practical terms, the lack of minimum file format requirements means DLNA is mostly an organisation that lets big tech companies get together and test their devices with each other.

In order to make sure you're getting the right media streamer or Nas box, you really have to read the specification list. Our experience is that most DLNA Nas boxes will support a wide range of file types, with the exception of Sony's HS1 which refused to stream DLNA's optional file types.

When buying any streamer, make sure it's UPnP compatible as a minimum requirement, if you plan on streaming from a Nas device. The Linksys DMA2200 Media Center Extender (www.pcw.co.uk/2208886) is an example of a non-UPnP streamer. It needs a computer running Windows Media Center to be turned on to deliver media. It benefits from a very flashy interface, but it can be expensive and impractical to leave a computer on all day.

DRM (digital rights management) is defined as a core charter of DLNA too, so



The Firefly Media Server enables the iTunes server and can be installed free

devices must support the DTCP-IP security mechanism and optionally Windows Media DRM too. While most Nas drives should make protected media available, many streamers won't be able to open them.

Pinnacle's Showcenter 250HD media streamer (www.pcw.co.uk/2206786), for example, supports Windows Media DRM video and audio files but others, such as Linksys' Kiss 1600, don't. The only upside in the DRM-minefield is that it is disappearing fast from commercial stores such as Napster, iTunes and Amazon, and therefore becoming a non-issue.

If you have already bought a lot of music on iTunes and you want to stream this music, then you're left with only one option: Apple's own Airport Express.

That's because up until this year, music bought on iTunes had Apple's Fairplay DRM on it, which means the music can only be played on Apple products. There are some other digital audio receivers (the Pinnacle Soundbridge, for example) that can stream unprotected music from iTunes, but the music will only be unprotected if you've copied it from a CD yourself or obtained it elsewhere.

The iTunes functionality we've spoken about in this group test is the ability of a Nas to

stream music in the same way as iTunes streams it to the Soundbridge. In practice, a Nas drive will store all your music, you'll enable its iTunes server and then open up iTunes on any home computer and below the 'Library' and 'Store' links on iTunes' left navigation page, you'll see a 'Shared heading with the Nas drive listed, offering you its music.

The Firefly Media Server (www.fireflymediaserver.org), previously called the mt-daapd project, is usually the software that enables the iTunes server and it can be installed free on any Windows, Mac or Linux computer. Since most Nas drives are actually stripped-down Linux computers, it may even be possible to install the Firefly Media Server on a Nas that isn't advertised as having iTunes server functionality.

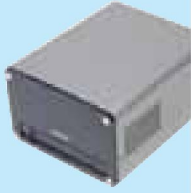
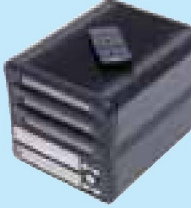
If your biggest concern is video compatibility, rather than audio, then check for the DivX logo on your media streamer, because that will ensure a wide range of video files are supported. The Playstation 3 is an officially certified DivX device, which means movies encoded with DivX's DRM will play perfectly on it. The Xbox 360 doesn't have official DivX support, but it will play back non-DRM DivX videos because it has MPEG4 support.



Digital rights management is a core part of DLNA so devices must support the DTCP-IP security mechanism and, optionally, Windows Media DRM

Networked media drives

						
MANUFACTURER	CISCO	D-LINK	IOMEGA	LACIE	NETGEAR	
Model	Linksys Media Hub NMH305	DNS-323	Storcenter ix2	Internet Space	ReadyNAS Duo RND2150	
Price	£269.99	£139.99	£317	£184.99	£279.99	
Sales telephone	0800 026 1418	020 8955 9000	No UK number	020 7017 0040	01344 458 200	
URL	www.linksysbycisco.com	www.dlink.co.uk	www.iomega-europe.com	www.lacie.com	www.netgear.co.uk	
SPECIFICATIONS						
Max number of internal drives	2	2	2	1	2	
Number of drives preinstalled	1	0	2	1	1	
Drive included (capacity, cache)	WD AV-GP (500GB, 8MB)	N/A	Seagate Barracuda 7200.11 (1TB, 32MB)	Seagate Barracuda 7200.11 (1TB, 32MB)	Seagate Barracuda 7200.11 (500GB, 32MB)	
Hot-swappable disks	✗	✗	✗	✗	✓	
Raid 0/1/JBOD	✗/✓/✓	✓/✓/✓	✗/✓/✓	✗/✗/✗	✓/✓/✓	
USB2 ports	2	1	2	1	3	
External hard drive support	✓	✗	✓	✓	✓	
eSata ports	0	0	0	0	0	
Ethernet speed	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit	
PROTOCOLS SUPPORTED						
iTunes server	✓	✓	✓	✓	✓	
FTP server/print server	✓/✗	✓/✓	✓/✓	✓/✓	✓/✓	
NFS support	✗	✗	✓	✗	✓	
Personal web server	✗	✗	✗	✗	✓	
Bittorrent/HTTP download to Nas	✗/✗	✓/✓	✗/✗	✗/✗	✓/✓	
Scheduled on/off	✗	✗	✗	✗	✓	
OTHER						
Remote network backup	✗	✗	✗	✗	✓	
Email notifications	✗	✓	✓	✗	✓	
Included backup software	NTI Shadow	Memo	Retrospect	Desktop Mirror	Shadow	
Warranty	1yr	2yrs	2yrs	2yrs	3yrs	
Dimensions in mm (wxdxh)	111x168x198	105x196x130	79x200x122	117x193x45	101x222x142	
SCORES						
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	
Value for money	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	
OVERALL	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	

							
	QNAP	RAIDSONIC	SONY	SYNOLOGY	THECUS	WESTERN DIGITAL	ZYXEL
	TS-209 II	Icy Box NAS4220-B	Vaio Home Server HS1	DiskStation DS209+	M3800 (0S-NAS3800-2000)	Sharespace	NSA-220
	£236	£114.99	£489	£414	£549.99	£499.99	£206.99
	No UK number	0870 162 0818	020 7365 2947	01908 673 709	0844 288 6868	01372 360 055	01344 303 044
	www.qnap.com	www.nanopoint.co.uk	www.sonystyle.co.uk	www.synology.com	www.originstore.com	www.wdc.com	www.zyxel.co.uk
	2	2	2	2	3	4	2
	0	0	2	0	2	2	0
	N/A	N/A	WD Caviar Blue (500GB, 8MB)	N/A	Western Digital WD10EADS (1TB, 32MB)	Western Digital WD10EACS (1TB, 16MB)	N/A
	✓	✗	✗	✗	✓	✗	✗
	✓/✓/✓	✓/✓/✓	✗/✗/✓	✓/✓/✓	✓/✓/✓	✓/✓/✓	✓/✓/✓
	3	2	3	3	2	3	2
	✓	✓	✓	✓	✓	✓	✓
	0	0	0	1	1	0	0
	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
	✓	✓	✗	✓	✓	✓	✓
	✓/✓	✓/✓	✗/✗	✓/✓	✓/✓	✓/✗	✓/✓
	✗	✓	✗	✓	✓	✓	✗
	✓	✗	✗	✓	✓	✗	✗
	✓/✓	✓/✓	✗/✗	✓/✓	✓/✓	✗/✓	✓/✓
	✗	✗	✗	✓	✓	✗	✗
	✓	✗	✗	✓	✓	✓	✗
	✓	✗	✗	✓	✓	✓	✗
	Netbak Replicator	None	PC Link	Data Replicator 3	Thecus Backup 1.3	WD Anywhere Backup	Memeo
	2yrs	1yr	1yr	2yrs	3yrs	3yrs	2yrs
	175x214x115	138x243x82	270x270x71	88x218x160	173x218x158	160x199x196	113x202x142
	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

How we tested

To test file transfer speeds, we copied a 901MB file between each Nas appliance twice in each direction in Windows Explorer, repeating if there were wild fluctuations between runs. The average time taken was then used to calculate a transfer speed in megabytes per second (Mbytes/sec).

To ensure each drive performed as fast as possible, the devices were connected via a Gigabit switch and Cat 5e cables (we found Cat 5 cables limited our network to 100Mbps/sec). For Nas enclosures that don't come with drives as standard, we used two 1TB Western Digital RE2-GP hard drives, which are designed specifically for Raid network appliances. They include technology to detect and compensate for the vibrations in multi-drive systems and recovery restrictions that reduce the chance of it being removed from a Raid setup for unresponsiveness.

Each Nas was speed tested in Raid 0 and then Raid 1 mode. Raid 0, also called striping, typically offers higher performance and disk capacity but if one of the drives fails, all your data is lost. Raid 1, also called mirroring, offers top-notch data security because if one drive fails, all the data is mirrored on the other drive. The downside to Raid 1 is that two 1TB drives will only produce a 1TB volume, not a 2TB volume like Raid 0 would offer.

We also streamed several different video formats from each Nas to a Playstation 3, to test for DLNA compatibility. The toughest of these tests was an 8.5GB H.264-encoded high-definition movie. We also tested Xbox 360 compatibility by streaming a 900MB standard-definition Xvid-encoded video.

Our test PC used a 2GHz Core 2 Duo processor, 2GB of Ram and Broadcom Gigabit Ethernet. To ensure that the PC's own disk performance didn't cause a bottleneck, we installed a 1GB software Ram disk to store the test file on the host PC, so it didn't have to access its own hard drive.

Power measurements were taken in Raid 1 mode. Idle power measurements were taken when the hard drives had been set to spin down, if at all. This happened between five and 30 minutes, although some Nas devices refused to lower their power consumption even after an hour of inactivity. Load power measurements were taken when the Nas was streaming a 1080p high-definition clip to a Playstation 3.



Sony's Playstation 3 was used to test DLNA streaming

Editor's Choice

Editor's Choice Netgear Readynas Duo RND2150
Recommended D-Link DNS-323



Netgear Readynas Duo RND2150

Most of these Nas boxes offer an excellent experience for streaming media to your preferred device, the only real exceptions to this being the Western Digital and Sony Nas units, although future firmware updates may improve their streaming abilities.

One thing we would certainly recommend before buying any Nas is to check the website and the community behind them. The Readynas Duo, Synology Diskstation and Qnap Nas boxes



D-Link DNS-323

all have loads of extra utilities you can download from the manufacturer's website, making them more useful in the long run. Forums are also useful for ironing out firmware problems, or learning about hosting your own personal website on a Nas, developing new applications and deploying old Linux programs too.

As for whether or not you need to consider Raid, there's not as much of a performance gap between Raid 1 and Raid 0 as we expected. And, in light of the widely reported failures of

some hard drives recently, it seems prudent to go for the security offered by Raid 1, whichever Nas you choose.

There's no one size fits all in the Nas market, especially when you've got super-cheap devices such as the Icy Box often selling for less than £100, and super-capable drives such as the Synology DS209+. But frankly, if your main reason for buying is to join the DLNA bandwagon on a tight budget, then the D-Link DNS-323 is deserving of our Recommended award. Drop in a 1TB drive for £80 and you've got an affordable media store that is well made, easy to set up and quiet.

For the ultimate Nas experience, the Netgear Readynas Duo RND2150 takes our Editor's Choice. Not only did it breeze through our media streaming tests with ease – in particular our fast forward high-definition video test that threw a spanner in the works with other Nas boxes – but it also has an excellent set of hard-core Nas features. These include FTP, print and personal web servers and scheduled on/off. This hibernate-type function is one of the best features to hit Nas drives in the past year, because it lets the Nas go to sleep at night, conveniently lowering your electricity bills without you having to lift a finger to switch it off. **PCW**



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Provide By : <http://ESiti.in/forum>



ON TEST

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Editor's Choice

'If you hate wires and want to send your stored video to a TV set without dropping frames, Draft N wireless network is the ideal option'

Draft N routers

These high-speed routers use a yet to be finalised, but highly lauded, technology. Paul Monckton pits six against each other

Touted as a replacement for wired networks, Draft N wireless equipment promises much in terms of speed and extended range. People now want to do more with their wireless networks, including streaming media, and network-attached storage (Nas) drives and home servers are increasingly popular ways of centralising your storage – we've tested a dozen of those in this month's other group test (see page 82).

But if you hate wires and want to send your stored video to a TV set without dropping frames, or you want to be able to back up your laptop to a Nas without waiting all day, then a Draft N wireless network is the only way to go.

Draft N wireless gear has been around for so long now that it may come as a surprise to many of you that the standard has still not been ratified. While some of us may have originally viewed the high-speed successor to 802.11g

with some trepidation, fearing last-minute changes to the standard might render expensive new kit obsolete, we don't care any more.

With ratification due (perhaps) this year, we're pretty confident that you will have no compatibility issues with routers that conform to the current version two of the draft – the same version implemented by most of the 802.11n products we reviewed over a year ago.

We've reviewed six Draft N routers that include ADSL2+ modems for broadband access. Cable users can often find modem-less versions of these routers, or very similar models, at a slightly reduced cost. We've included pricing for these versions where available, along with the prices of any network adapters you may need to connect to your PC for your new wireless network to operate at peak performance – many manufacturers now offer a USB wireless dongle to match their routers.



AVM Fritzbox Fon 7270

Price £179 Contact www.fritzbox.co.uk



The Fritzbox Fon range from AVM redefined our expectations of the modem router. In fact the 7270's feature set is so much more advanced than the competition we've had to bump all the other features scores down a notch to accommodate it.

Additional features include a fully integrated PBX with answering machine, which enables you to connect wired or Dect wireless handsets to the router and make calls, either over your standard fixed

telephone line or using internet-based Voice over IP (VoIP) technology. The Fritzbox will route the right calls over the right network and can assign individual telephone numbers to all connected handsets while managing multiple VoIP accounts.

It can optionally be configured to work with a cable modem, although you'll lose use of one of the Lan ports.

On the back of the unit a USB host port can be used to share a non-GDI printer with your network or for connecting a USB disk drive, which enables the router to function as an FTP server. The drive can also be shared on your Windows network like a basic Nas drive and provides streaming music playback to devices compatible with the UPnP-AV standard. Multiple USB devices are supported by plugging in a USB hub.

In our tests, the Fritzbox Fon 7270 performed well: although not the fastest at close range – Dlink's model performed considerably faster – it delivered excellent performance in the longer range test, which suggests very good performance around the home.

This router also has the advantage of dual wireless frequency bands, although not simultaneously, so if you're in an area competing with other wireless devices you may be able to gain clearer transmission by switching from the usual 2.4GHz band up to the less congested 5GHz band.



Verdict

Pros Massive feature set, including money-saving telephony options

Cons Price; No URL or IP address-based web access filtering

Overall The Fritzbox 7270 has a massive feature-set, including internet telephony options. It's a good performer too, but may be overkill for home users

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Belkin N+ Modem Router

Price £100 Contact <http://catalog.belkin.com>



Belkin's N+ Modem Router looks a little different. There's a reason radio masts don't lie flat along the ground and a reason this router's vertical design is a good idea. Raising the twin antennas higher should give you better reception.

Unfortunately, like the aforementioned radio mast, it also tends to be rather more visually obtrusive – festooned as it is with huge and very bright blue status icons, including an internet 'speedometer'. Belkin has

softened the blow with some sweeping curves but it must surely be unlucky to display this level of decorative illumination so long after Christmas. As part of the router's eco-friendly controls, the lights can be dimmed and the wireless network can be programmed to turn itself off at night on any specified days.

Whether or not the high-rise design has anything to do with it, the Belkin N+ Modem Router is an excellent performer. Sitting right at the top of nearly every performance result, it's a clear winner for anyone who wants to take full advantage of the speed available from 802.11n.

Belkin's configuration is easy to use and promises much. Unfortunately, we could not get it to detect the router on either of our test PCs and had to configure it manually. Wireless setup is simple nonetheless, thanks to WPS support.

Support for dual SSIDs allows you to provide guest access to your internet service without access to your home network. Users can join the wireless Lan either using standard WPA encryption or by having their browsers automatically redirected to a holding page into which they must enter a password.

Like the Fritzbox, Belkin's router comes with a USB host port to which you can attach storage devices to be shared on your network or over the internet.



Verdict

Pros Strong feature set; USB device support; Excellent performance

Cons Large and visually obtrusive; no power switch; no wireless-off switch

Overall Excellent performance and features make this router a compelling purchase, though it may be a little large if your needs are basic

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

D-Link DKT-810

Price £115 Contact www.dlink.co.uk



We looked at the DKT-810 over a year ago, when it received our Great Value award for its strong set of features at a competitive price. Today it is still a good-value product: it's by no means the least expensive, but the kit comprises a DSL2740B router and a DWA-140 USB wireless adapter and is the only package we tested to include such an adapter in the price.

However, given that many laptops now come with

wireless functionality built in, you may find the adapter superfluous. Probably one of the best-looking routers of the group, the D-Link product eschews space-age swooping curves and opts for a tasteful rectilinear design constructed with exceptional build quality.

Three detachable antennas line the back of the unit, along with the usual four network ports, power and broadband connections. Its recessed reset switch will get you out of a jam, should you forget your passwords. A handy label on the underside indicates the meanings of the indicator LEDs and the default password and IP address.

The router's wireless QoS settings let you prioritise important data traffic over the wireless network. This is useful in situations where you don't want file transfers to cause a streaming video to skip. It's different to the QoS features available on the Fritzbox, which allow you to prioritise broadband bandwidth allocation on a per-application basis. A basic parental control is also included that can restrict internet use by time of day – although it doesn't filter individual sites or log activity.

This router performed better this time than the last time we tested it, although it still suffers greatly in the longer distance test where it languishes at the bottom of the table, achieving less than one-tenth of the performance of the fastest.

Verdict

Pros Physical build quality; good value package; QoS features

Cons Performance suffers at longer distances; no web filtering

Overall Still a good value option, despite its age, this router performs very well up close, but suffers over longer distances

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Linksys WAG160N

Price £90 Contact www.linksysbycisco.com



The WAG160N is unique in this group because it has no visible antennas, making it extremely home-friendly and unlikely to clutter up the desktop. Despite the lack of visible Wifi tackle, the router performs rather well over longer distances.

A stand-out feature of this range of routers is the Linksys Easy Link Advisor (Lela) software application. With Lela you can see a graphical overview of your entire network, revealing all connections, both wired

and wireless. Clicking on the icon for your router allows you to view detailed information and gain access to the web interface without having to remember any IP addresses. Non-Linksys products are also included in the network map, although without such detailed control options.

You can use Lela to connect your PC to the wireless network automatically and configure security options and troubleshooting problems. Alternatively, you can connect new devices to the wireless network using the WPS button. You also get a 30-day trial of Trend Micro Internet Security.

Advanced users can get their hands dirty via the router's browser-based interface, which offers a good level of configuration options including internet access policies that can be set on a PC by PC basis, with URL and keyword-based blocking strategies available.

While this router lacks some desirable features, such as support for USB storage devices and website logging, there's plenty of functionality and performance for the vast majority of home users and the WAG160N is also one of the cheapest routers.

Belkin's N+ Modem Router only costs an extra £10 for better features and performance, but for some the compact, unobtrusive and easy to use Linksys WAG160N will be an ideal purchase.



Verdict

Pros Very user friendly; no visible antennas; unobtrusive design; price

Cons No USB device sharing; two-year warranty

Overall Internal antenna array keeps it very compact yet with good range performance at a competitive price

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Netgear Wireless-N Modem Router DGN2000

Price £116 Contact www.netgear.co.uk



The DGN2000 is an ultra-compact device: Small, black and cute, it's approximately half the size of D-Link's router, making it easy to tuck out of the way. Trendnet's TEW-625BRM has similarly small proportions, but Netgear's router looks better with a two-tone finish and large, illuminated status icons.

The right-hand side of the router houses two recessed buttons, one for WPS and the other turns the wireless function on or off. The WPS function enables

a simplified setup without the need to configure or remember complicated Wifi passwords.

Having a wireless on/off switch makes it simple to deactivate the wireless Lan, without having to delve into the router's configuration menus. This saves power and makes the wireless network impenetrable to hackers while you're away. Holding both of the above buttons will perform a factory reset.

The rear of the router houses a pair of non-removable antennas, a four-port switch, broadband connector and a power switch.

The DGN2000 lacks some of the more technical features such as configurable QoS options, but is strong on parental control options and can log website visits and block access to undesirable sites by URL or IP address filtering.

Performance-wise, the DGN2000 delivered average results across the board. While it did suffer a little over a longer distance, it tended to fare better than either the Trendnet or D-Link products.

This is a very straightforward router that's easy to set up and use and has been well designed both in terms of aesthetics and usability, but the two-year warranty is a little stingy compared to the 11-year or lifetime warranties offered elsewhere, especially when you consider the high price of this product.

Verdict

Pros Compact, aesthetically pleasing design; ease of use

Cons Price; mediocre performance

Overall Simple and easy to use, but rather pricey

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Trendnet TEW-635BRM

Price £80 Contact www.trendnet.com



Trendnet's tiny TEW-635BRM is a modest device that, due to its rather cheap construction, looks as if it should cost less than the others.

Thankfully, it does. At £80, this router is much cheaper than the other products in this round-up.

There are many similarities between the TEW-635BRM and Netgear's DGN2000. They share the same physical dimensions and offer an identical selection of ports and buttons. On this router, the

WPS and wireless on/off buttons are on the back.

As a cheaper product, the TEW-635 BRM excludes some of the touches that help new users set things up easily, such as an automatic configuration wizard.

Although the printed quick-start guide offers simple step-by-step instructions to get you up and running, you'll have to dig deeper into the full manual or the browser interface to discover more advanced features. The TEW-635BRM also lacks printed information on the router itself, such as the default password.

The TEW-635BRM supports dual SSIDs, so your router can appear as two distinct wireless networks with different security settings on each. You could use this option to configure a 'guest' network, although Trendnet's solution doesn't have a 'hotel mode' where guest users are redirected to a holding page for password-protected web access.

The TEW-635BRM delivered average performance that tailed off somewhat over longer distances. So if you're specifically looking for maximum range or fast multimedia streaming we suggest you look elsewhere.

This is a competent router that offers improved value for money over its better-looking rival from Netgear, but we'd recommend spending a little more if you're not comfortable with reading manuals and setting things up yourself.

Verdict

Pros Price; guest mode

Cons Cheaper plastic construction; performance over longer distances; lack of easy setup software

Overall A good low-cost wireless router, but best for those who know what they're doing. Performance could be better

Features ★★★★★

Performance ★★★★★

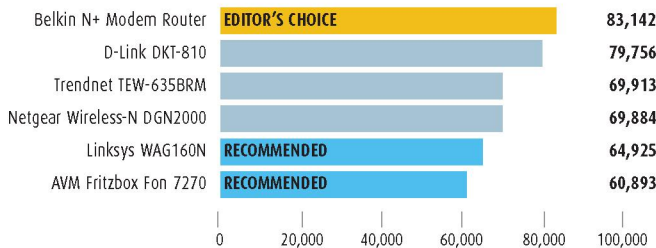
Value for money ★★★★★

Overall ★★★★★

Lab results

The Belkin N+ Modem Router performed very consistently, while AVM and Linksys worked best at long distances

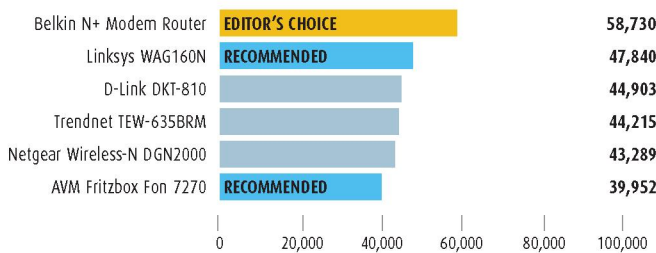
Short distance: Fixed block size – send in Kbits/sec Bigger is better



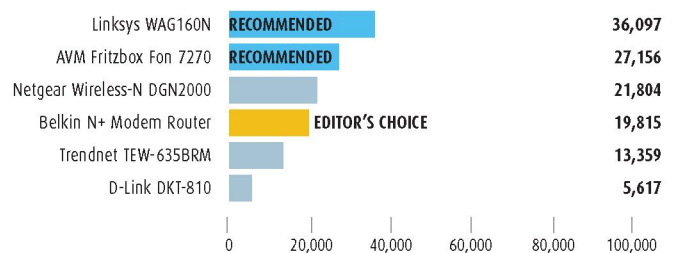
Long distance: Fixed block size – send in Kbits/sec Bigger is better



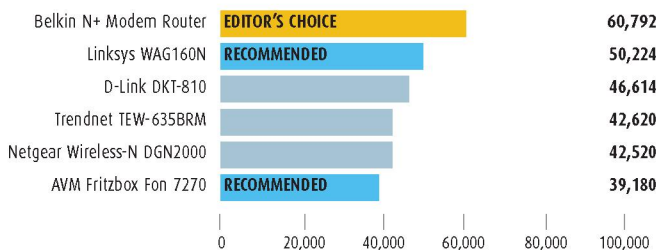
Short distance: Fixed block size – receive in Kbits/sec Bigger is better



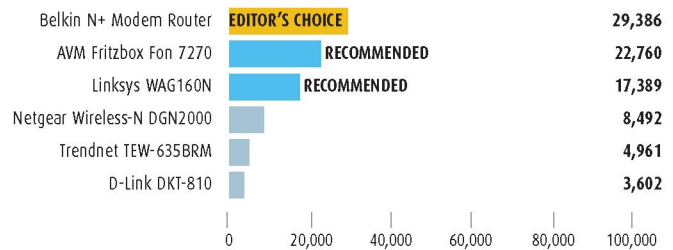
Long distance: Fixed block size – receive in Kbits/sec Bigger is better



Short distance: Variable block size – send in Kbits/sec Bigger is better



Long distance: Variable block size – send in Kbits/sec Bigger is better



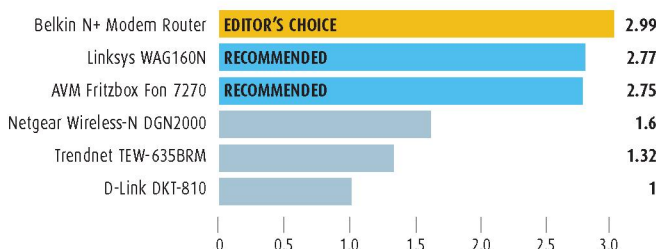
Short distance: Variable block size – receive in Kbits/sec Bigger is better



Long distance: Variable block size – receive in Kbits/sec Bigger is better



Overall relative performance index Bigger is better



How we calculated our results

To calculate the overall relative performance index, we normalised the results in each test, so that the worst performer scored one. A router that was twice as fast in that test would score two and so on. The total scores for each router across all tests were then averaged, and normalised once more, so that the lowest overall result was one. All the other performance indices are relative to that of the slowest overall router.



Draft N routers

MANUFACTURER	AVM	BELKIN	D-LINK	LINKSYS	NETGEAR	TRENDNET
Model name	Fritzbox Fon 7270	N+ Modem Router	DKT-810	WAG160N	Wireless-N Modem Router DGN2000	TEW-635BRM
Price/Non-modem version	£179/N/A	£100/£80	£115/£96	£90/£80	£116/£91	£80/£45-£120
Product URL	www.fritzbox.co.uk	http://catalog.belkin.com	www.dlink.co.uk	www.linksysbycisco.com	www.netgear.co.uk	www.trendnet.com
WIRELESS SUPPORT						
Frequency bands	2.4GHz and 5GHz	2.4GHz	2.4GHz	2.4GHz	2.4 GHz	2.4GHz
No of antennas	3 external	2 external	3 external	2 internal	2 external	2 external
Multiple SSID support	✓	✓	✓	✗	✓	✓
One-touch security setup	✓	✓	✗	✓	✓	✓
WLAN repeater mode (WDS)	✓	✗	✗	✗	✓	✓
ADSL SUPPORT						
ADSL2+ modem	✓	✓	✓	✓	✓	✓
RFC 2516 PPPoE/ RFC 2364 PPPoA	✓/✓	✓/✓	✓/✓	✓/✓	✓/✓	✓/✓
NETWORKING FEATURES						
Network ports	4	4	4	4	4	4
WPS	✗	✓	✗	✓	✓	✓
Wireless on/off button	✓	✗	✗	✗	✓	✓
USB host ports (1.1/2.0)	1/2.0	1/2.0	None	None	None	None
Nat	✓	✓	✓	✓	✓	✓
SPI firewall	✓	✓	✓	✓	✓	✓
DoS attack prevention	✓	✓	✓	✓	✓	✓
VPN support	✓	✓	✓	✓	✗	✓
DHCP server	✓	✓	✓	✓	✓	✓
UPnP compliant	✓	✓	✓	✓	✓	✓
DDNS support	✓	✓	✓	✓	✗	✓
Application-based QoS	✓	✗	✗	✓	✗	✓
Protocol/port-based QoS	✓	✗	✓	✓	✗	✗
MISC						
Factory reset button	No reset button, but short dial #991*15901590*	✓	✓	✓	✗	✓
Warranty	5 years	Lifetime	11 years	2 years	2 years	3 years limited
Easy setup wizard	✓	✓	✓	✓	✓	✓
Power switch	✗	✗	✓	✗	✓	✓
USB wireless adapter included	✗	✗	✓	✗	✗	✗
DSL filter included	✓	✓	✓	✓	✓	✗
Telephony features	* see below	✗	✗	✗	✗	✗
PARENTAL CONTROLS						
Parental controls	✓	✓	✓	✓	✓	✓
Time-based usage control	✓	✓	✓	✓	✓	✓
Website logging	✗	✗	✗	✗	✓	✓
URL content/IP filtering	✗/✗	✓/✓	✗/✗	✓/✗	✓/✓	✓/✓
STANDARDS						
802.11b/g/a/n draft version	✓/✓/✓/2	✓/✓/✗/NS	✓/✓/✗/NS	✓/✓/✗/2	✓/✓/✗/NS	✓/✓/✗/2
Wep 64-bit/128-bit	✓/✓	✓/✓	✓/✓	✓/✓	✓/✓	✓/✓
WPA-PSK/WPA2-PSK	✓/✓	✓/✓	✓/✓	✓/✓	✓/✓	✓/✓
MAC address authentication	✓	✓	✓	✓	✓	✓
DMZ host	✓	✓	✓	✗	✓	✓
AVAILABLE CLIENT ADAPTERS						
PCI/price	✗/N/A	✗/NA	Express Card/£61	✗/N/A	✓/£80	✓/£35
USB/price	✓ (Draft N Stick/£49)	✓/£50	✓/£57	✓/NS	✓/£70	✓/£30
Other/price	✗/ N/A	Express Card/£40	PC Card/£55	✗/ N/A	✓/£80	PC Card/£35
PHYSICAL & ENVIRONMENTAL						
Dimensions cm (wxdxh)	21x15.5x2.5	8.3x16.9x21.7	22x15x3.2	20.2x3.4x16	17.75x13x3.1	17.5x13x3
Weight	883g	390g	610g	362g	265g	255g
Average power consumption	5W 9 max	6W average 11W max	NS	NS	NS	6W (max)
Eco-mode (energy saving)	✓	✓	NS	Energy Star certified powersupply	✓	✓
SCORES						
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OVERALL	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

* PBX for internet and fixed-line network (ISDN and analogue lines), Dect Base station with HD audio Codec G.722 for up to 6 Dect Gap phones, fax and integrated answering machine. Key= NS = Not specified

How we tested the Draft N routers

Draft N devices are often rated at speeds of up to 300Mbps/sec, but, even under ideal conditions, real-world throughput is always much lower than this link speed. Many factors can influence performance: transmission range, interference from other networks and devices, and obstacles such as walls all have a negative effect on network speed.

To test the routers we used Performance Test 6.1 from www.passmark.com. This software includes a network test that can stream data directly between two PCs on a network using various block sizes and protocols, avoiding possible bottlenecks such as slow hard drive performance.

We wanted to make sure there was minimal interference, so we used another program from Passmark, Wirelessmon, to monitor signal strength as well as the presence of other wireless networks which could interfere with our results.

We tested performance in two locations: the first just two metres away from the router and the second in another room, through two open doors and across a hallway. In each location we tested throughput in both directions using fixed and variable block sizes.

To ensure the best possible performance, transfers took place

between a notebook PC on the wireless network and a desktop system connected via a wired-link directly to the router. No other devices were connected during the tests.

Each router was configured to use the highest possible wireless performance settings. This often involves locking out slower wireless protocols such as 802.11b. Where available, we allowed the routers to select the wireless channel automatically – otherwise we selected channel one.

To mimic the recommended setup for home or business use, we enabled WPA2 encryption – while this does incur a small performance penalty we feel it's closer to real-world usage and therefore will provide more useful results.

Where possible, we tested each router with the manufacturers' own matching USB wireless adapters. Where these were not available, we tested with two adapters from other manufacturers using different wireless chipsets and recorded the best score.

Performance today is broadly similar to the results we were seeing last year, with the biggest differences between products to be found in the longer distance tests.

Editor's Choice

Editor's Choice **Belkin N+ Modem Router**

Recommended **Linksys WAG160N • AVM Fritzbox Fon 7270**



Belkin N+ Modem Router



Linksys WAG160N



AVM Fritzbox Fon 7270

Among the six wireless routers tested here, we found large variations in price, performance and features. AVM's Fritzbox Fon 7270 costs more than twice as much as Trendnet's TEW-635BRM, but brings with it a host of telephony features that could save a small business plenty of money.

D-Link's DKT-810 comes bundled with a USB wireless adapter, making its £115 price rather attractive.

There are also large variations in size: The D-Link router is about twice the size of the Netgear or Trendnet products.

Bearing this in mind, there's no definitive router that will be the best choice for everybody. However, with cheaper 802.11g routers still

available, we feel an 802.11n product really ought to offer excellent range and speed as these are the principal reasons for upgrading.

Our first Recommended award goes to the Linksys WAG160N. At £90, this router is priced very competitively, has no visible antennas and is exceptionally easy to set up and use. It also delivers very good performance in situations where other routers struggle.

At the other end of the price scale, we would also like to recommend the Fritzbox Fon 7270 which, thanks to its integrated PBX, can provide a small office or large home not only with wireless internet access but also a complete telephone system capable of handling multiple extensions and multiple internet telephony

accounts, which could dramatically reduce your phone bills. Basic file and printer sharing is also provided via its integrated USB port which lets you set up an FTP server too.

With the focus on performance and range, our Editor's Choice award has to go to Belkin's N+ Modem Router which trounced the competition in our performance tests. At £100, the price is still very reasonable and it supports advanced features, such as setting up a separate hotspot without Lan access and a USB port that allows you to use plug-in storage devices as Nas drives. Its tall and relatively bulky profile won't appeal to all, but for those looking to improve their Wifi coverage and throughput it's an excellent purchase. **PCW**



AMACOM

DATA LOCKER

PIN Protected AES Encrypted USB 2.0 Hard Drive

The World's Most Secure PIN Protected Portable Hard Drive

The Amacom Data Locker features a comprehensive set of innovative, proprietary technologies in order to provide users with the simplest to use, most secure portable hard drive on the market.

The Data Locker is the only portable hard drive which is 100% platform independent, all of its security measures are performed within the device itself. Unlike other secure devices which require authentication through the host system, Data Locker users must authenticate themselves via a touch screen LCD panel on the Data Locker to deactivate the security measures. Only after the authentication process is completed is the drive recognised or accessible by the host system. This allows the Data Locker to remain driverless and software free as well as being both PC and Mac compatible.

The Data Locker's unique authentication system eliminates the threat of infected systems, keyboard loggers or brute force attacks. This authentication system coupled with hardware based 128 or 256 bit AES (CBC Mode) full drive encryption provides unparalleled security.

Key Features

- 128 or 256 Bit AES Hardware Encryption
- Higher Level Encryption Using Cipher Block Chaining (CBC) Mode
- Up To 18 Digit User Defined PIN
- Unique User Generated Encryption Key
- LCD Touch Screen For Authentication
- One Touch Data Eraser For Redeployment
- Platform Independent Security Process
- Driverless And No Software Required
- PC And Mac Compatible



Technical Specifications:

Capacity:	160GB, 320GB & 500GB
Drive Specs:	2.5 Inch SATA, 5400 RPM, 8MB Buffer
Interface:	Hi Speed USB 2.0
Bus Transfer Rate:	Up To 480Mb/Sec
Dimensions:	127mm x 76mm x 20mm
Weight:	256 grams
OS Compatibility:	Compatible With All

Available Models

Feature:	Data Locker Model:		
	Personal	Pro	Enterprise
Encryption Algorithm	Proprietary	AES CBC Mode	AES CBC Mode
Encryption Key Strength	Bespoke	128 Bit	256 Bit
Self Destruct Mode		•	•
Master Administrative Password			•
One Touch Data Eraser		•	•
Platform Independent	•	•	•
Driverless And Software Free	•	•	•
PC And Mac Compatible	•	•	•
USB Bus Powered	•	•	•
Hardware Based Malware Protection	•	•	•

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CES Show - Jan 2009:

The Data Locker Pro was recognized by CES 2009 as a top computer peripheral innovation.



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ONLY THE FAX

If you thought that fax went the way of the dinosaurs, you need to think again. Despite the growing assault from email, SMS and instant messaging, it refuses to lie down and die. In this month's Business section, we look at the options available if you want to take advantage of this mature, but still very usable, technology.

We've some interesting product reviews too, starting with an HP thin client that looks and feels like a notebook, plus a network remote access appliance from Billion which combines the best of IPsec and SSL VPN technologies.

On the software front, we take a tour of the venerable ACT customer relationship management tool, now sold by Sage and in its 11th incarnation. Hardware-independent cloning is the order of the day with the Universal Imaging Utility and we close by looking at what the web-based Service Desk Plus has to offer.

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BUSINESS



OUR SCORING

Excellent ★★★★★ Very good ★★★★☆ Good ★★★☆☆ Below average ★★☆☆☆ Poor ★☆☆☆☆

OUR AWARDS

Editor's Choice: The best product in a comparative group test. Anything that wins this award is of better quality than its competitors.

Recommended: A product that combines great features, usability and value for money.

Great Value: Not the best in class, but a product that has superior features and performance for the price.



Editor's Choice
Business



Recommended
Business



Great Value
Business

The business awards are used for products that are more suited to home offices or small businesses.

'The Compaq 6720t has no local storage other than a small amount of Flash memory, making it of little value if stolen or left in a cab'
Read the review on page 108

Fax of life

*There is still life in the humble fax.
Alan Stevens investigates*

With email reaching into every corner of both personal and business life it's not unreasonable to assume fax to be on its way out. That, though, is far from the case with sales of both fax machines and related products, if not growing, at least holding their own. In part, that's because the fax is a mature, easy-to-grasp and very usable technology but, equally, because businesses large and small rely on its ability to transmit exact facsimiles with a minimum of fuss.

Fax then is something we all need, so in this feature we look at where we are with the technology and product choices open to the small-business buyer.

The fax machine

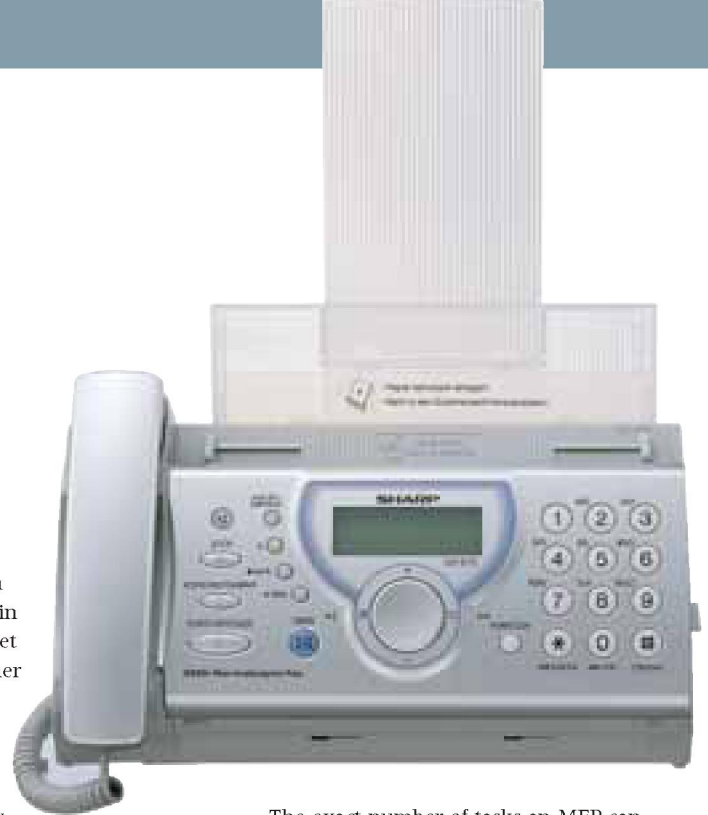
For small start-ups and home workers an ordinary fax machine is still seen as a must-have. After all they don't cost much (we found machines for sale online starting at just £25 ex Vat), added to which they're an understandable technology which anyone can use with little training. Buy the right one and you also get a phone, fax and an answerphone included. You can even use the

fax as a copier, although make sure you get a plain paper fax, based on inkjet or laser technology, rather than an old-style thermal device.

Whether or not you'll need a dedicated line will depend on how much faxing you need to do and/or how much the phone will be used for voice calls. There are, however, other running costs to bear in mind, such as the ink/toner and paper required and the fact that the fax machine needs to be powered on all the time. Bear in mind too that junk faxes are still quite prevalent and you could end up spending money receiving all sorts of rubbish you don't really want.

Fax and the MFP

Fax may not have diminished in popularity but the dedicated fax machine has. Not because it doesn't have a use, but because of the ready availability of multifunction printers (MFPs) which can fax and do a lot more, typically combining an inkjet or laser printer with a scanner and a built-in fax modem.



The exact number of tasks an MFP can complete will depend on the vendor and device involved, but as well as a printer and scanner most can be used as copiers as well as replacements for conventional fax machines. Some can even be connected to the Lan (either wired or, in some cases wirelessly) with facilities to send and receive faxes remotely on some models.

Typical of this kind of device is Lexmark's X7675 which we reviewed in the business section back in January. Selling for just over £200 ex Vat, this four-in-one device gives you a fast colour inkjet printer (up to a claimed 27 pages per minute in colour) with duplex support plus a colour scanner, complete with automatic document feeder. It's also got Gigabit Ethernet and Wifi networking and for faxing, a built-in modem plus a socket for a standard phone handset.

Faxes can be sent using the front panel controls, with a built-in address book and fax broadcast facilities. Alternatively you can install software to send and receive faxes from a PC, although on this product that's only possible if the MFP is directly attached to the host system using USB.

MFPs based on laser technology are also available with a host of products from companies such as Canon, HP, Ricoh and others.

Software faxing

Another alternative to MFPs and fax machines is software to enable Word, Excel, PDF and other documents to be faxed directly without having to print them out and scan them back in again. Incoming faxes can, similarly, be converted to digital documents and viewed on the PC, rather than having to print them out, although that of course remains an option. Fax software can be divided into two distinct types. Local

The scanner came too

If you opt for software-based faxing, bear in mind the need for a scanner of some kind if you want to fax paper originals, plus the software to drive it. This is not a problem if you do a lot of faxing, with plenty of

affordable scanners to choose from, but if you only send faxes occasionally it's a real bugbear that can make you yearn for a conventional fax machine.



If using fax software don't forget the need for a scanner if you want to send paper originals

applications designed to be installed and run on a single PC or notebook and so-called fax servers where faxing becomes a shared network service. The pros and cons are pretty similar in either case.

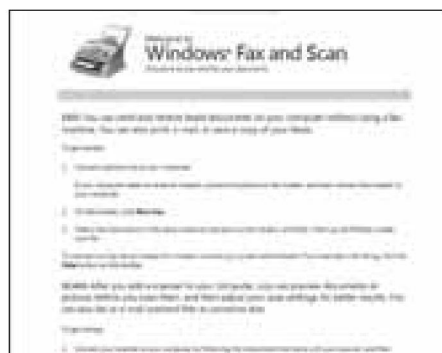
On the plus side, software makes it a lot easier to send a fax, typically by 'printing' a document to special fax print driver. It's then either routed out via a local fax modem or sent to a queue on a shared fax server. Incoming faxes are also easier to handle, particularly on a fax server where the faxes can be routed around the network as email attachments. The fact that you're no longer tied to a fixed fax machine or MFP is another benefit, but it's not all good news.

To begin with you need a fax modem, either in the local PC or the shared server. Most notebooks still come with a modem built in, making it easy to send faxes when out and about, but they're becoming rarer, especially on netbooks and low-end products. If this is the case you'll need to buy a suitable adapter or external modem as you will for use with most desktop PCs.

'For small start-ups an ordinary fax machine is still seen as a must-have'

As they're shared, most fax servers are designed to work with custom adapters capable of supporting multiple lines, typically using ISDN, again adding to the costs. Then there are the call charges to consider, although the fax software itself is standalone it needn't cost much. With Windows XP and Vista including faxing tools as standard, third-party fax applications are becoming very thin on the ground.

Fax server applications haven't diminished in number quite so much, with a wide choice of products available such as Zetafax from Equisys (www.equisys.com) and Rightfax, now called Open Text Fax Server, from Avanquest Solutions (www.avanquest-solutions.co.uk). However, as good as these products are, they



Fax software is included in Windows Vista but you'll need a fax modem or fax server connection in order to use it

Multifunction printers such as the Lexmark X7675 let you print, scan, copy and fax using just one affordable device



can be a significant investment, requiring a lot of support to get right and are, as a result, only worth considering if fax is really important to your business.

Email to fax services

Ultimately, that leads onto the big growth area in the fax market – email-to-fax services. An increasingly popular option because they require no up-front investment in either hardware or software beyond simple browser plug-ins. You don't even need a phone line, just an internet connection, and the service provider giving you your own number to receive and optionally send faxes. Some care is called for before jumping in, however, with three quite different services to choose from.

The cheapest services are those that let you only receive faxes, with documents faxed to the number you're assigned, then forwarded as attachments to your preferred email account. These are good if all you want is to be able to put a fax number on letterheads and business cards and don't expect it to be used that much. As such it can

be premium number, enabling the service provider to make money out of any faxes sent, while you pay little if nothing at all. Alternatively you can pay a small subscription and get a non-geographic number of your choice, effectively anywhere you like.

Next up are services that only let you send faxes. Such as Pamfax for Skype (www.pamfax.biz) which lets you pay for faxes sent over the internet using Skype Voice over IP (VoIP) credit. And lastly services to send as well as receive faxes, such as BT PC Fax (www.tinyurl.com/dy6bdm) or Efax (www.efax.com), both of which can be trialled for free.

Email-to-fax services are a good choice for the small business as you can use them anywhere and only have to pay for the faxes you send. But they're not the only option, as we've outlined in this feature, and you need to consider what's best for you before committing to any of the solutions on offer. **PCW**

The pros and cons of using Fax over IP

Slated as the next big thing in faxing, Fax over IP (FoIP) does for facsimile what Voice over IP (VoIP) did for voice. It gets rid of the need to fax via a modem and analogue telephone line in favour of transmitting documents digitally over an IP network such as the internet. Naturally, there's a standard governing the technology involved – T.38 – with drawbacks as well as benefits to using it.

The benefits include being able to send and receive faxes without the need for specialised hardware, such as fax modems and ISDN adapters. Instead, all that's needed is an Ethernet interface and internet connection. Costs are further reduced because just like VoIP, digitised FoIP traffic can be routed globally at no extra charge. The only costs involved are for the broadband connections at each end.

The drawbacks tend to be centred on the problem that there's no guarantee the

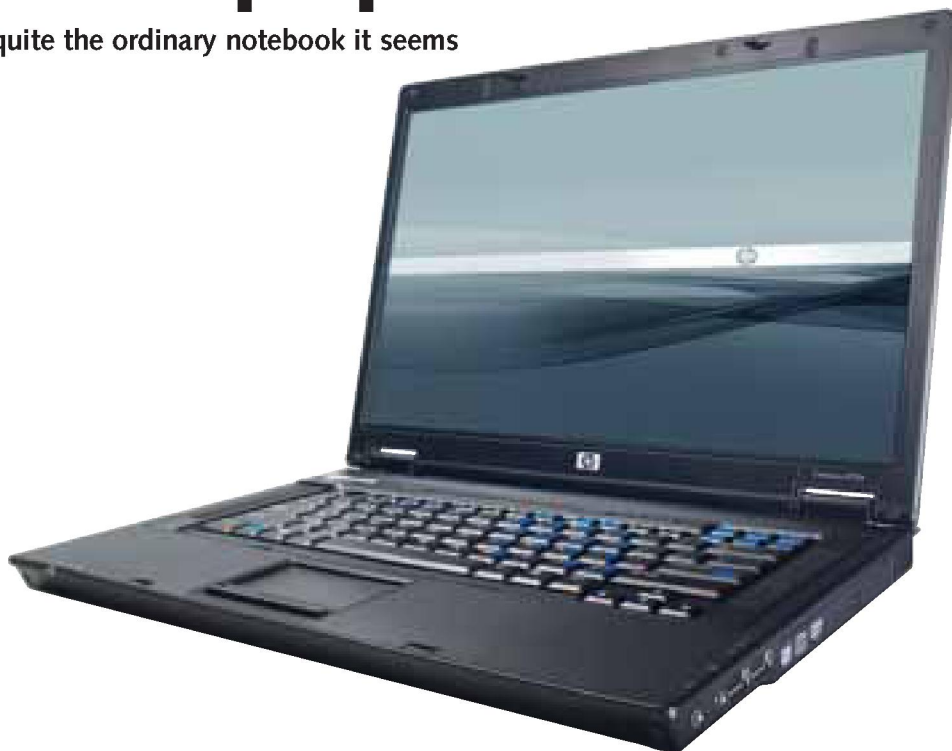
people you want to fax will have compatible FoIP facilities – just as you can't expect everyone to have a VoIP phone. For example, you can't buy a T.38 fax machine or MFP with an Ethernet port ready to plug it into your network. That's not a problem if you're faxing to someone else in the organisation where you just have to make sure they've got compatible FoIP software.

However, just like VoIP, if you want to send faxes and be sure they'll be received, the digital FoIP traffic will have to be converted back to analogue fax format and forwarded over the Public Switched Telephone Network at some point. That means you need a gateway of some kind either externally hosted or installed on your network. Most VoIP PBX solutions, offer this kind of facility. It may not seem like a big issue, but the need for a gateway is a sticking point that makes Fax over IP more of a big company rather than a small business technology.

THIN CLIENT

HP Compaq 6720t

Not quite the ordinary notebook it seems



The 6720t has no local storage – just 1GB of Flash memory

It looks like an ordinary laptop, but the HP Compaq 6720t is really a thin client, for use with Windows Terminal Services and the latest desktop virtualisation solutions. More than that, it's the first truly portable thin client to be released by HP since it acquired specialist vendor, Neo Ware, well over a year ago.

A thin client is a kind of cut-down PC that, instead of executing programs itself, runs just the local GUI while the main code is hosted by a remote application server. Management overheads are reduced as a result and the whole approach is a lot more secure because everything is held on the server – an important consideration when it comes to notebooks.

To this end the Compaq 6720t has no local storage other than a small amount of Flash memory, making it of little value if stolen or left in a cab. Not that you'd know that until you turned it on, of course.

The spec is nothing special, but that doesn't really matter on a thin client. The processor, for example, is an Intel Celeron M 423, clocked at 1.06GHz with just 1GB of memory as standard. That can be doubled using a standard Sodimm, but it's hard to think why.

The screen is a decent enough 15.4in flat panel with a 1,280x800 resolution and there's the usual built-in keyboard and touchpad pointing device. There's no hard disk just that 1GB of Flash memory (2GB on higher priced models) plus an optional DVD-Rom drive, with no optical rewriter of any sort in the price list.

Networking is catered for by an integrated 10/100 fixed Ethernet interface plus an 802.11b/g Wifi adapter, just like a 'real' notebook. A couple of USB2

ports are also provided for local printers and other devices plus a modem and a PC Card slot, but there's no support for the latest Express Card technology.

The operating system is Windows XP Embedded with support for Windows Remote Desktop using the Microsoft RDP protocol, plus Citrix ICA for Metaframe deployments. HP then adds a number of more specialist tools, to enable the 6720t to be used with its client virtualisation products, such as TeemNT terminal emulation, PDF Complete and Intervideo WinDVD player.

You also get a local browser and it is possible to install local applications, although the 1GB of Flash memory limits what's possible and that's not really what the product is all about.

Build quality is what you'd expect of HP and we had no problems connecting the Compaq 6720t to a Windows terminal server and running remote applications. A six-cell lithium-ion battery gives four to five hours' use with a couple of long-life batteries as optional extras, the biggest of which can keep the notebook running for a claimed 14 hours or more.

On the downside it's far from cheap compared to both conventional thin clients and standard notebooks. Indeed, you could buy an ordinary laptop, complete with solid-state storage and, effectively match, if not beat, what the 6720t has to offer at around half the price.

You will need to do some work configuring the software involved and you won't get the HP add-ons, however, if you're a small business looking for a portable thin client that's unlikely to matter. This is one for the corporates with bigger budgets to play with.

Alan Stevens

Verdict

Pros No local storage makes it very secure; built-in Wifi; good battery life; bundled tools

Cons Expensive; relatively low specification

Overall A well-made thin client in notebook form, but pricey and unlikely to appeal to the small-business buyer

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Price £547 (£476 ex Vat)

Contact HP 0870 241 3625
www.hp.com

Specifications 1.06GHz Intel Celeron M 423 processor • 1GB 667MHz DDR2 Ram • 15.4in WXGA LCD (1,280x800 resolution) • 1GB Flash storage; optional 8x DVD-Rom drive • Gigabit Ethernet port; 802.11b/g Wifi • three USB2 ports • Windows XP Embedded

REMOTE LAN ACCESS

Billion Biguard S3000

Conventional remote access in a self-contained appliance



With dual Wan ports and built-in Gigabit switch the Biguard S3000 is well equipped to handle multiple remote user connections

Did February's snow stop you or your staff getting to work? Remote access would have helped and it doesn't have to be difficult or expensive. Billion's Biguard S3000 offers a combination of conventional IPsec virtual private network (VPN) and SSL-based remote access in an easy-to-deploy, self-contained appliance.

The S3000 sits towards the top of the Biguard family aimed at companies with 150 or more employees. It has dual Gigabit Wan ports supporting both load balancing and failover in the event of a service going down. It also has a built-in eight-port Gigabit switch for Lan connectivity, with one port that can be configured as a demilitarized zone (DMZ). Port based Vlan and QoS prioritisation are also supported.

Designed to be rackmounted, the appliance is 1U in height and can be deployed either behind an existing firewall or standalone, with a comprehensive stateful packet inspection (SPI) firewall which is another key product feature. Maximum throughput is 60Mbps/sec enabling the S3000 to handle up to 10 simultaneous remote SSL sessions, upgradeable to 50 if required, and 30 IPSec connections. On the downside there's only one integrated power supply, but you have the option of automatic failover to a second, backup appliance if you're prepared to pay for it.

Setup and day-to-day management are done via a browser using a Java-based tool with optional SNMP support if preferred. We opted for the web route, with a quick-start menu that took us through the basic setup, configuring both the Wan connections and enough of the SSL VPN settings to enable users to connect remotely. It wasn't particularly difficult but the interface isn't the easiest we've used and technical

knowledge is assumed. You'll also need to delve beyond the quick-start options to take full advantage of what the S3000 has to offer and companies with little or no in-house expertise may need to have the product professionally installed.

There's no need for special client software or setup, as the necessary encryption can be provided by SSL-enabled browsers such as Internet Explorer and Mozilla Firefox. All the end user has to do is point a browser at a customisable web portal and log in to gain access to remote Lan resources.

There's a choice of authentication here, using a built-in database or external Windows Active Directory, domain, LDAP or Radius server. Also available is support for Biguard OTP (One Time Password) using chip-based tokens (from £48 ex Vat for two) to provide two-factor authentication using dynamically generated Pin codes as well as an ordinary password.

Once logged into the web portal remote users can access the network in three main ways: an Explorer-like 'Network Place' browser plus network and transport extenders, the extenders delivering the kind of seamless access provided by conventional VPN clients. Proxies to run specific applications can also be accessed via the portal with simple controls over what users are allowed to see and do once connected.

It's all quite simple, but some user training will be required, as well as a fair amount of behind-the-scenes configuration to get it to work the way you want.

Price could be an issue with plenty of alternatives available for less, both from Billion and others. In its favour the S3000 is well specified, easy to manage and the extra money worth paying if you want to handle more than a handful of remote users. *Alan Stevens*

Verdict

Pros Dual Wan ports for load balancing and failover; integrated SPI firewall; web portal; optional two-factor authentication

Cons Single power supply; cost

Overall Support for all the latest remote access technologies in a well-configured and easy-to-manage appliance

Features ★★★★★

Performance ★★★★★

Value for money ★★★★★

Overall ★★★★★

Price £1,643 (£1,429 ex Vat)

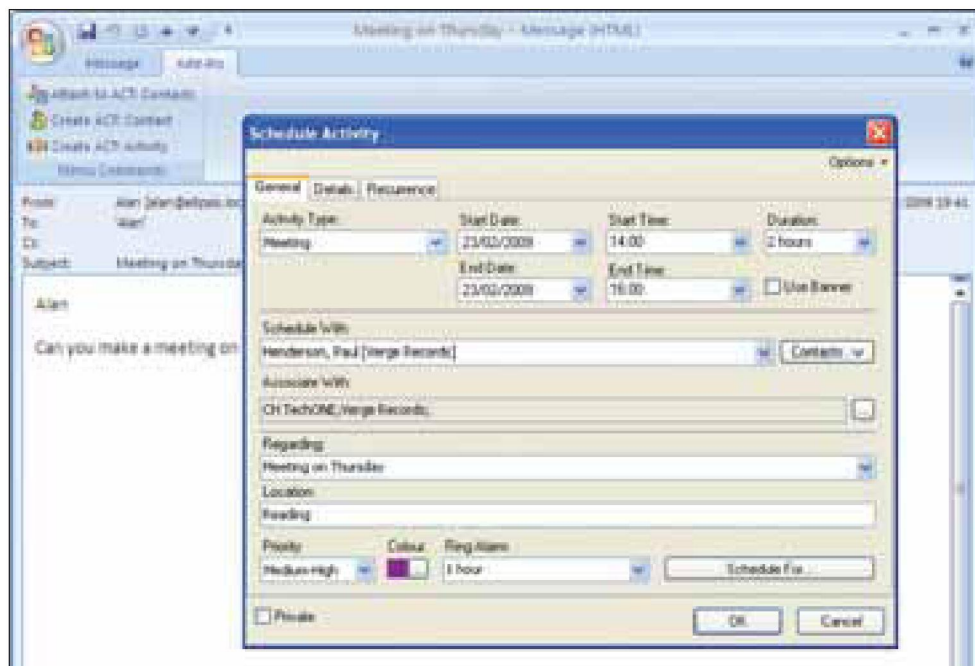
Contact Billion 020 8982 8228
www.billion.uk.com

Specifications Two 10/100/1,000Mbps/sec Gigabit Wan ports • Eight 10/100/1,000Mbps/sec Gigabit Lan ports

CUSTOMER RELATIONSHIP MANAGEMENT

Sage ACT

An affordable CRM tool with some useful features



ACT activities can be scheduled directly from an Outlook email

ACT is probably the best known and most used of small-business CRM (customer relationship management) applications. It provides the tools needed to manage customer contacts and any associated written, email, phone or other communication. Now owned by Sage, the 2009 release is the 11th in its long history, with a lot of useful new functionality as well as the usual middle-age nips and tucks.

Part of the appeal of ACT is that it's very easy to get up and running, all you need is a Windows PC. Installation takes just a few minutes with an integrated setup routine to handle everything involved, including making sure you have the correct .Net Framework and a copy of SQL Server Express 2005, to manage the data.

Another benefit is that there's no need for any database expertise, for the most part you won't even know it's there. In addition the database can be shared by up to 10 clients or if you go for ACT Premium (£295 ex Vat per user) there are also a few extra options plus a web-based version of the product added on.

On the downside it can take a while to get to grips with everything ACT has to offer, but a key selling point has to be Office integration. Small businesses like ACT because, rather than use the built-in tools to manage customer contacts, write letters, send emails and so on, Outlook and Word can be used instead.

Thankfully, all the necessary integration work is all done during setup. Outlook integration is further enhanced in the latest version with a new setup assistant to make it easier to configure new users, plus the ability to quickly attach multiple emails from

different senders to contact records. You can also use Outlook's message rules to do this kind of processing automatically. It's also now possible to create ACT activities directly from within an Outlook email, for example, to schedule a meeting or create a to-do item when a message arrives.

Calendars come in for an update too, with a new one-click button to synchronise data held in ACT and Outlook formats. ACT calendars can also now be printed with filters, such as date ranges and priority settings applied. Similarly contact names associated with an activity can be included in the printouts, while in the premium edition you can view activities for all users, not just 10 as before.

Certain features which were previously only available in ACT Premium have also been migrated to the standard package. Principally these include task-automation options, with a built-in scheduler to take backups and perform other maintenance tasks as well as copy calendars between ACT and Outlook. Backups can also be speeded up by excluding message attachments and when synchronising data to mobile devices there's an improved progress bar to show more accurately what's happening.

Then there are those nips and tucks we mentioned, such as being able to search for a contact using part of a name or title and switch between contact, group and company searches without having to re-type the parameters. You can also view recent contact lookups by type, date and so on.

All of which makes it even easier to get attached to this affordable CRM tool which grows on you the more you use it, the latest version further adding to the appeal.

Alan Stevens

Verdict

Pros Closer integration with Outlook; new one-button calendar copy; enhanced search and printing options; task automation features

Cons Steep learning curve

Overall The market leader in small-business CRM and with this release, likely to remain number one for some time to come

Features ★★★★★

Ease of use ★★★★★

Value for money ★★★★★

Overall ★★★★★

Price £207 (£180 ex Vat)

Contact Sage 0800 44 7777
www.sage.co.uk

System requirements 1.8GHz processor or faster • 1GB Ram • 1GB free disk space; Windows XP (32-bit only), Vista or Server 2003/8 • Microsoft Office 2002 or later required for Office integration

PC PROVISIONING

Big Bang Universal Imaging Utility

Hardware-independent disk imaging tool for those who need to deploy Windows on multiple PCs



The UIU wizard explains the process of turning a model PC into a hardware-independent deployment image

The task of installing new PCs can be mindlessly repetitive; even if you are only installing a handful of them, it can take up enormous amounts of time.

Disk-imaging tools help, but you need to create separate images to cope with PCs from different vendors or even simple changes of adapter. The Universal Imaging Utility (UIU) solves this by creating a hardware-independent image that can be deployed regardless of who makes the PC, its hardware options or even whether it's a desktop or laptop.

The UIU supports Windows XP and Vista and, despite the name, doesn't have imaging functionality – it's designed to be used in conjunction with other disk-imaging tools from companies such as Acronis and Symantec. Windows Tablet PCs can also be handled, the only prerequisite being V3.5 of the .Net Framework and an internet connection for the latest updates.

Begin by building the PC you want to clone, complete with any applications, desktop and network settings that apply to your organisation. Once this 'model' system has been created, it is recommended you capture an image in case things go wrong.

After doing that you install and run the UIU software to turn it into a ready-to-install copy of Windows complete with drivers for all the different hardware options you're likely to need. A database of some 26,000-plus drivers is provided by the developers, Big Bang, with new ones added and updated regularly.

A wizard guides you through the various processes involved, starting with a best practices scan of the model PC, which is referred to as a Master Image

Machine Integrity Check (Mimic), just in case you've forgotten anything.

On the XP Professional machine we used for testing, UIU needed to be pointed at a copy of Sysprep to create an answer file for use with that utility. Support for the XML equivalent is also available if deploying Vista.

Once the wizard has finished, you'll have a ready-to-install implementation of Windows on the model PC. Boot normally and it will simply reinstall itself, so instead, you have to boot using Dos or WinPE then capture a hard disk image using your preferred imaging or backup program.

Copy that image to another PC and when it's booted the OS will be installed. As part of the process, the UIU database searched for drivers for use on the platform involved. Unfortunately, the database is quite large, but it's a fairly quick process with enhancements in the latest 4.0 release to make it both faster and more accurate. Plus there's a new UIU discovery tool to identify potential hardware setups in advance and only copy the drivers really needed to the model PC image.

We found the UIU easy to use, but it's clearly aimed at IT professionals and has little in the way of help for those new to the processes involved, especially when it comes to the new discovery tool. You will also need to bear in mind the need for volume licensing and that to really benefit you have to be installing Windows on a regular basis across a spectrum of different hardware.

That said, the UIU works well and, for companies needing to deploy Windows on a variety of PCs, it could save time and money.

Alan Stevens

Verdict

Pros Creates a hardware-independent disk image; database of over 26,000 Windows drivers; discovery tool to optimise size of driver database

Cons No built-in imaging capabilities; not for the novice

Overall Does the job but only worth considering if installing Windows on a variety of hardware configurations

Features ★★★★★

Ease of use ★★★★★

Value for money ★★★★★

Overall ★★★★★

Price £12.70 (£11.04 ex Vat) per target PC (25-seat licence)

Contact Binary Resource

0800 404 9282

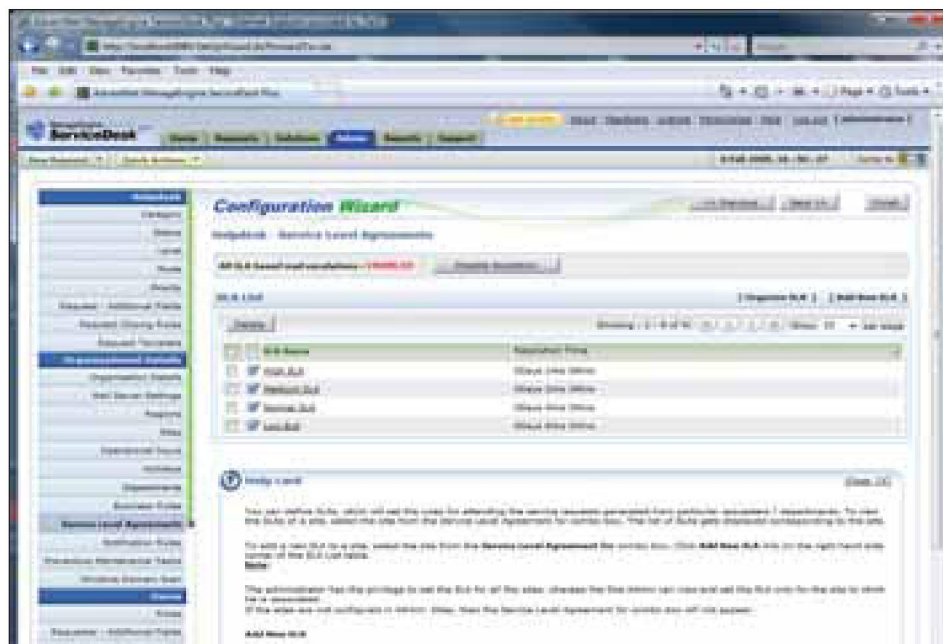
www.Binaryresource.com

System requirements Windows XP with SP2 or Vista (32-bit Business and Enterprise editions) • 3.5GB free disk space • Internet connection for updates • Existing disk-imaging and deployment tools (eg Symantec Ghost, Altiris Migration Suite, Novell Zenworks, Acronis Deploy Center/True Image, Power Quest Drive Copy)

HELPDESK SOFTWARE

Service Desk Plus 7.5

Helpdesk software in a browser from Manage Engine



A wizard helps configure the various options in Service Desk Plus, such as service level agreement settings

Helpdesk applications can be both expensive and complicated. Service Desk Plus from Manage Engine, however, is priced at a level most small businesses can afford and is entirely web-based, making it a lot easier to install and use compared to some of the big-name alternatives.

You don't need a highly specified system to run Service Desk. We installed the software on a Vista PC, but you can use any version of Windows from 2000 onwards or Linux with the main component running as a background service in each case. We also opted to use the built-in MySQL database, whereas for larger deployments you would probably want to connect to a separate SQL Server system and maybe, run Service Desk itself on a server host.

All that's needed at your end is a browser, making for easy remote access. Point it at the Service Desk host using the port number specified during installation, log on when prompted, and you're in.

A configuration wizard is available to take you to the post-installation setup. This can also be run independently and takes you through each available option. You can, for example, categorise help requests, set priority levels and configure business rules as well as add user accounts for both requesters and technicians, specify what mail server to use and so on.

The process is fairly lengthy and a little baffling for newcomers with a lot of jargon to master. On the plus side everything is explained as you go, but it's worth spending time getting used to how the application works rather than jumping in and trying to make it fit your requirements straight away.

This is because there's an awful lot on offer, starting with some substantial core helpdesk functionality.

Requests for help, for example, can be logged manually or via email, with templates available to help capture the required information. Users can also raise requests themselves and track their status online via a self-service portal. It is possible to build your own knowledgebase to quickly resolve known problems, which is also accessible via the self-service portal.

Requests can be assigned to specific helpdesk groups and individuals, these can be prioritised and escalated as required with tools to enable technicians to indicate what action has been taken and close the request once the problem is resolved.

The process can be monitored and managed with facilities to set and assign service-level agreement rules, manage compliance, automate management processes and keep users informed of what's going on.

Comprehensive reporting is a key feature with Service Desk Plus. It also benefits from being ITIL (Information Technology Infrastructure Library) ready. Opt for the Professional Edition (from £748 ex Vat for two technicians) and an integrated asset management option adds tools to capture hardware and software inventories and use that information elsewhere in the package. There is also an enterprise edition (from £2,252 ex Vat for five technicians), which adds extra incident, problem and change management facilities, while lower down the scale, a single-user helpdesk-only version is available for free.

Our only issue was the time it took getting used to how Service Desk Plus works, although that is not unusual for a helpdesk program. However, it's an impressive product that will suit a variety of small businesses looking for a flexible helpdesk solution that won't break the bank.

Alan Stevens

Verdict

Pros Affordable with a single-user version available for free; web-based; ITIL ready; optional inventory and asset management features

Cons Can be a bit baffling at the beginning

Overall This web-based helpdesk is easy to deploy and can be customised to suit a variety of small-business requirements

Features ★★★★★
Ease of use ★★★★★
Value for money ★★★★★

Overall ★★★★★

Price From £447.23 (£389 ex Vat) – Standard Edition (two technicians)

Contact Networks Unlimited
 0800 085 6661

www.manageengine.co.uk

System requirements Windows 2000 or later (32-bit only), Red Hat 7.x or Debian 3.0 Linux • 512MB Ram • 200MB free disk space • Browser required for access • SQL Server can be used instead of built-in MySQL database



PROCESS OF ELIMINATION

It's easy to keep track of how many programs you've got open at any one time simply by looking at the Windows Taskbar. However, this doesn't tell the whole story, and there could be any number of background processes hogging your PC's resources without you being any the wiser. In this month's Windows we show you how to keep track of all the processes running on your PC and, more importantly, how to rein in the more troublesome ones.

In Digital Imaging and Video, we delve into the world of time-freezing special effects. They're finding their way into all manner of TV programmes, but what you might not know is that, with a bit of insider knowledge, it's possible to create similar effects on your PC. Also this month, compound primary keys go under the spotlight in Databases, while in Sound we take you through the inner workings of audio in Windows Vista.

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Advice from our experts

Our experts solve your problems

HARDWARE

Q Over several months I have been recording TV programmes with my Hauppauge WinTV tuner. The files are in the order of 1.2GB for a one-hour programme, including five-minute padding at each end and the adverts in the middle. These have now mounted up, so I purchased a 500GB external hard drive to store them on. This is now getting full as well.

In an earlier edition you suggested editing padding and adverts from TV recordings to save space when archiving, so I bought Adobe Premiere Elements 7 and found I can successfully shorten the total running length. But when I used the 'Save As' command, the final result was considerably larger than the original. I then tried the 'Share in PC format' option, which was much better, but still slightly larger than the original. Changing the settings to reduce the quality to minimum allowed the file to be reduced to about 800MB, but the reproduction was awful.

Am I missing something fundamental, or is it just a fact of life that video files are enormous and cannot be reduced significantly?

Dennis Crawford

A Video files certainly can be huge and, as you've discovered, recompressing them won't necessarily come up with something smaller. The trick to achieving smaller files while maintaining quality is to use more efficient compression systems. If you intend to watch the resulting file on a dedicated device such as a DVD player, then your options are limited as they require standard MPEG2, but if you're playing back on a PC you have a wealth of options at your disposal.

Unless you find an application with the desired options for editing and recompressing, though, you should treat this as a two-stage process. First, edit your footage, before exporting with decent quality.



Then import this 'master' version into a second program for compression using an efficient format.

Today's most efficient video formats for delivering decent quality with relatively high compression are based on variations of MPEG4. These include Quicktime, DivX and the increasingly ubiquitous H.264, which is used on most Blu-ray titles, along with UK high-definition broadcasts. Microsoft's own WMV format also contains elements of MPEG4.

'The most efficient video formats are based on variations of MPEG4'

So we'd suggest trying any of the above formats. A great start would be to drag and drop the master file into the DivX Converter (see screen 1) from www.divx.com or try importing the file into Windows Movie Maker and exporting in the WMV format. We've found both to be effective compressors, although if you'd like

DivX Converter can be a useful tool when editing

to keep the same resolution and maintain good quality, you may only reduce your files to around one-half or two-thirds of their original size.

One final note: these new formats are computationally intensive both for encoding and playback, so when exporting you'll need to be patient. For smooth playback, you'll also need a recent hardware configuration. As with all archiving processes, don't delete your originals until you're absolutely happy with the results and your workflow.

Q I was interested in Gordon Laing's suggestion in February's Inside Information column on having a PC with not one, but two Raid arrays; one using Raid 5 for redundancy and the other using Raid 0 as a high-performance scratch disk. I wondered, would you need separate controllers for each array and could you mix disks of different sizes in the configuration? Could you also install a different version of Windows on each array?

Jean-Luc Vaillant

A The first part of your question depends on the controller, although many do allow multiple arrays to be built. A physical limitation, though, could be the number of channels available on the controller as most basic models only have four. So if two were used for a basic Raid 1 array, there would only be two remaining, which wouldn't be sufficient for Raid 5. More sophisticated models have eight or more channels, which provide greater flexibility, although you may prefer to install multiple controllers so not to saturate the bandwidth or processing power of a single host.

Each array should ideally use disks of the same size, as Raid will only use the lowest common denominator – so if you had a 750GB and 500GB drive in one array, it would treat them both as 500GB

models. You could, however, use 750GB drives in one array and 500GB drives in the other.

Finally, once a Raid array is partitioned and formatted, it's treated by your PC and operating system as a single volume. So yes, it would be possible to install different operating systems on each array and create a dual-boot system, although each OS will need to be supplied with the Raid controller driver during its initial setup process and on a floppy disk for pre-Vista versions. Consequently, many people prefer to use Raid for a separate data volume and simply boot from a single disk on a normal onboard controller.

DATABASES

Q I'm using Access 2007. If I'm looking at one record in Form view on the screen and I click Print, all the records print out, not just the one I want. How do I print one record on its form?

Andrew March

A You're right – in Access 2007 the default behaviour is to print all the records even though you view records one at a time in Form view. You can see this in action if you click the Office button, choose Print and then Print Preview (instead of Print); here you can see the output that will roll out of your printer.

To print a single record, view it on screen and click the Office button, selecting Print and Print and Print again. In the Print Range options, click 'Selected Record(s)' before clicking OK. Taking this route means that you don't get the option of seeing the Print Preview of this output, so if you need to see a preview before printing, you'll have to filter the records first.

To filter down to just the record you're currently inspecting on a form, it's often quickest to place the cursor in the primary key field and click the Selection button in the Sort & Filter group and select the top option, 'Equals whatever'; the 'whatever' should be the primary key value on which you left the cursor. Now selecting Print Preview should show you the preview of how your single record will look when printed.

To remove the filter, return to the Form view and click the Filtered button below the form; this returns you to the unfiltered set of records.

Video's eating up my hard drive

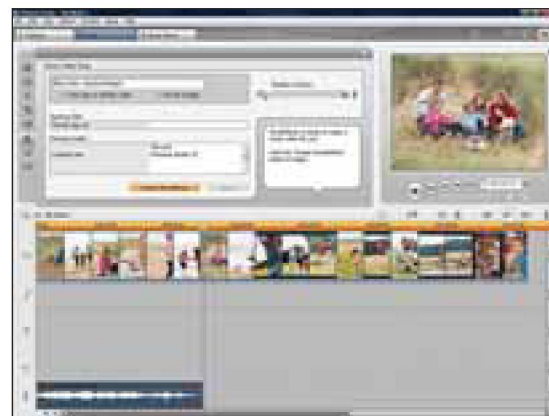
DIGITAL IMAGING

Q I have about 50 DV tapes and I bought a laptop to turn them into DVDs. I use Pinnacle Studio, which can be maddening but does the job. Alarming, after only three projects the hard disk has used about 70GB of space, although only less than 20GB of that is 'useful stuff'. The rest, I imagine, is all the deletions from Studio. I bought an external hard drive (a Maxtor Basics 250GB) with the intention of storing finished projects and all disc images externally for safety. I have checked the Maxtor, and the videos are stored as unreadable zipped files of just less than 200MB each.

Should I worry about hard drive space, or is it just overwritten? I also get a message saying the Maxtor is unsuitable as an expansion of the Toshiba hard drive as it is not fast enough.

Ian Baker

A To return to a Pinnacle Studio project and continue editing it where you left off, you need the Studio project file, which has the extension .stx and is stored by default in 'My Documents\Pinnacle Studio\My Projects', along with the captured clips (stored in the location you specify in the capture settings)



To allow for future editing, Pinnacle Studio stores numerous files for each project

and any other files you imported to the project (for example, titles, photos or other graphics). When you've finished editing your project, as long as you retain these files, you'll be able to go back to it.

To capture DV from a camcorder you need a fast hard drive that can maintain a data transfer rate of 25Mbits/sec. Your Maxtor external 5,400rpm USB drive may not be up to the task, but that doesn't mean you can't transfer DV files to the drive once captured. Use your laptop's internal drive for capture, or preferably a partition of it, and make sure it's regularly defragmented (head to Accessories, System Tools where you'll find Disk Defragmenter).

SPREADSHEETS

Q I use Excel 2003 with Windows XP and have a few workbooks that I use frequently. Among these there are a couple that always ask if I want to save the changes when I close them down, even if I have made no changes. I cannot find anything that would correct this problem and would much appreciate any help.

Martin Hall

A What we might call a change and what Microsoft calls a change are quite different, and you'll find this can happen with any Office application. It could be you've taken a printout, run an automatic macro or made a recalculation. I find the safeguard useful. If I've made a complete mess up of a worksheet, I'm glad I have the option of closing the file without making any changes so I can get back to where I started. In that light the feature is a solution more than a problem.

Q Is it possible to have a formula count the number of a certain character, such as an asterisk, in a range, bearing in mind that there may be more than one such character in a cell?

Arlene Bridger

A If the range that includes the character is A2: H2, then in another cell enter:

=SUM(LEN(A2:H2))-SUM(LEN(SUBSTITUTE(A2:H2,"*", "")))

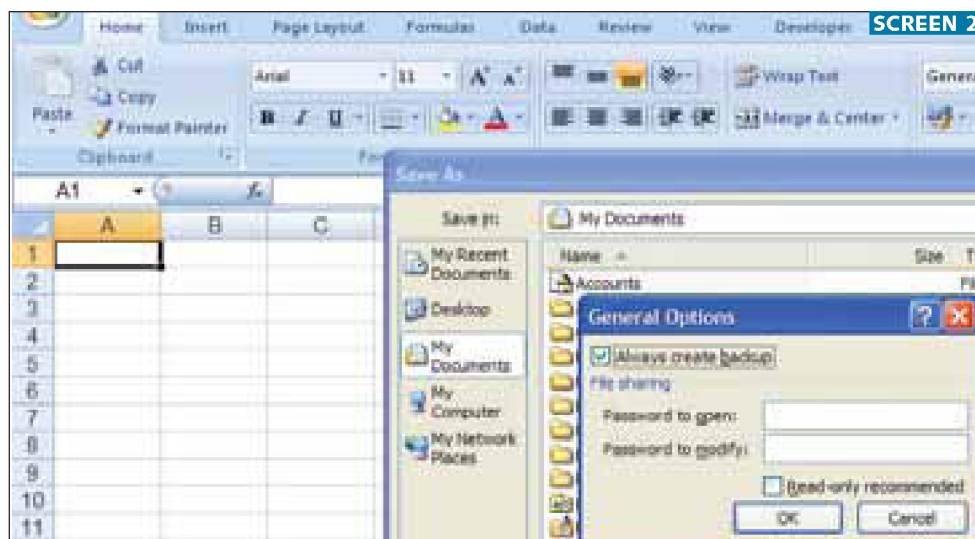
(Key: ⌘ code string continues)

Since Excel needs to make a calculation on each of the cells in the range, this is an array formula. So press Ctrl, Shift and Enter instead of just Enter. To count the number of any other character, just substitute it for the asterisk in the formula.

Q Do you know if anyone has produced an Excel template for grading pupils' class assignments?

Syeda Irtzall





A Microsoft offers one at www.tinyurl.com/55sh62. It was designed by Modelsheet for American schools, but with so much US software used here this probably won't bother you. The template produces a workbook with nine worksheets. It computes four measures of student reactions to each assignment, including the average grade earned; an indication of the difficulty of the assignment.

Q I believe it is possible to add something to a spreadsheet such that a backup is automatically created whenever the file is closed. I can't find any handle by which I can do this.
Ben Sladen

A You don't say what spreadsheet, nor which version of it, you are using. For the latest versions of Excel, when you use the Save As option, click the Tools button in the Save As dialogue box, then General Options and check the box against 'Always create backup' (see screen 2). A backup will be created at that time and renewed when you later resave the file. Optionally, in this dialogue box you can also specify a password needed to open the file. Bear in mind that by default, Excel will always save an Autorecover backup every 10 minutes. You can adjust the frequency and specify the folder where that file is to be saved under Office, Excel Options, Save.

Q Is there a formula to count the number of dates in a particular year in a list of dates of several years? I have a list

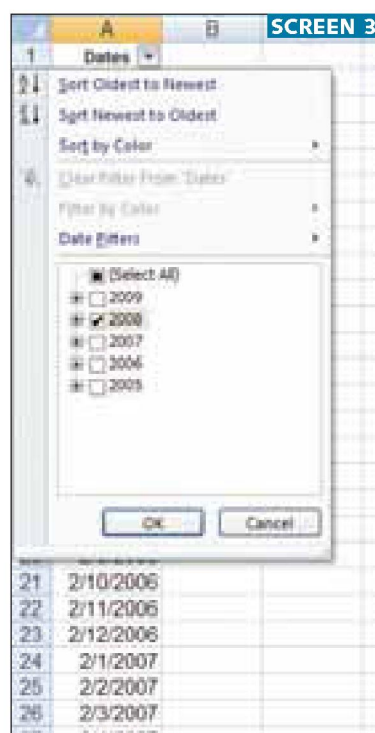
of dates from January 1 2005 to the present month on an Excel worksheet and want to see how many were in 2008.

Susan Barrett

A If the dates are in the range A2:A100, you could use the array formula:

=SUM((A2:A100<=DATE(2008,12,31))*(A2:A100>=DATE(2008,1,1)))

Use Ctrl, Shift and Enter, not just Enter. But why not use a built-in facility for doing this? Click within your list of dates. In versions that pre-date Excel 2007, choose Autofilter on the Data menu. Choose Custom from the dropdown arrow then show 'Is greater than or equal to 1/1/2008'



How to create Excel backups automatically

Filtering a list of dates in Excel 2007

and 'Is less than or equal to 31/12/2008'. With only 2008 dates showing, you can highlight the displayed range, right-click on the Status Bar and choose Count.

In Excel 2007, on the Home ribbon choose Sort & Filter. Click the down-arrow that appears alongside your column heading (see screen 3). Remove the checkmark next to Select All and add one next to 2008. Highlight the displayed range and in Excel 2007 the Count will be shown automatically in the Status Bar.

WINDOWS

Q I'm using Windows Vista and have a problem with sound volume levels. Playing CDs and MP3s is normal, but other applications such as Microsoft Messenger are hardly audible. Is there a way of turning the volume of these up without making other sounds too loud?
Gill Raymonds

A Vista keeps separate sound settings for different applications. If you click the speaker icon in the Notification Area, then click on 'Mixer' below the slider, this will open a mixer window (see screen 4) letting you set the volume for different programs independently.

Q How can I get rid of the ugly opaque box behind the text on my XP desktop icons? I'm sure I've seen 'transparent' text on other XP desktops, but I've searched the Display Properties high and low without finding the setting. Do I need to download a third-party utility to fix this?
Harold Byrne

A You don't need a third-party utility as this is built into XP. However, in a masterstroke of the counter-intuitive it is concealed deep within System Properties rather than Display Properties. Open the former, click the Advanced tab, and in the Performance section click Settings. Scroll down the list to the penultimate item – 'Use drop shadows...' Tick that and icon titles will turn transparent.

WORD PROCESSING

Q At one time I had a set of little icons on the left of the Word 2003 status bar that let me switch between normal, outline

and page layout view. But now they've gone. I still have the other items in the status bar for page, section and so on. How can I get the view switchers back?

Trish Robert

A They aren't actually in the Status Bar, but if you turn on the horizontal scroll bar from Tools, Options View, you'll see them, on the left, just above the status bar.

Q How can I change Autotext entries in Word 2003? I've created one with an error in it, but the Autotext dialogue doesn't appear to allow editing.

James Philips

A The easiest way is to insert the faulty Autotext entry, correct it and then select it. Now go to Insert, Autotext, Autotext... you'll see the selected corrected text in the preview area. Ignore this for the moment and scroll down, select the errant entry and you'll see the old text in the preview pane. Click the Delete button. The corrected text will reappear in the preview pane. Next, click the Add button and you'll be able to give the corrected entry the same shortcut as the old one. When you save the document, or close Word, don't forget to save the changes to the document template, which is where the Autotext entries are stored.

Q I have a table in Word 2003 and I want to change the colour and thickness of just the left-hand border cells. Is this

How to regain administration access in Ubuntu

LINUX

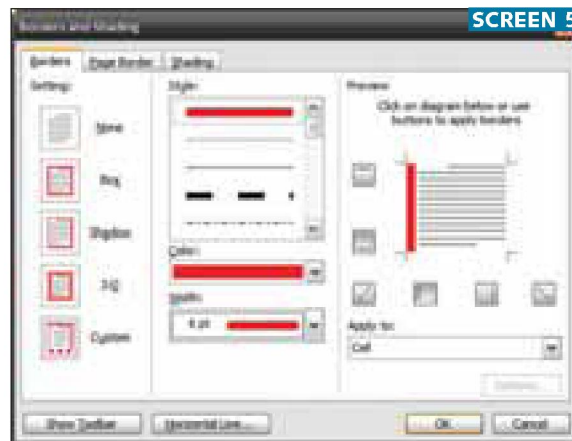
Q I have played around with my Ubuntu configuration and have lost administration access. I am unsure how to get this back. I have worked out how to access the system from a live CD and have tried looking at the `/etc/sudoers` file, but I am not sure what to do.

Duncan Jarvis

A As you have found out, it is very unwise to modify any system configuration unless you know exactly what you are doing. Administration access is

generally given through the `sudo` command, but you should never need to edit the `/etc/sudoers` file.

In Ubuntu, everybody in the 'admin' group has access to `sudo`, and the user you set the system up with is automatically added to this group. You should check that the `/etc/group` file is correctly set up. For example, if your user ID is 'duncan' try running '`grep duncan /etc/group`'. You should see your ID next to a few groups, including 'adm' and 'admin'. Normally you should not edit this file directly, but it may be necessary under these circumstances.



possible? When I select a cell and use the Borders and Shading dialogue, either nothing happens or it comes out wrong.

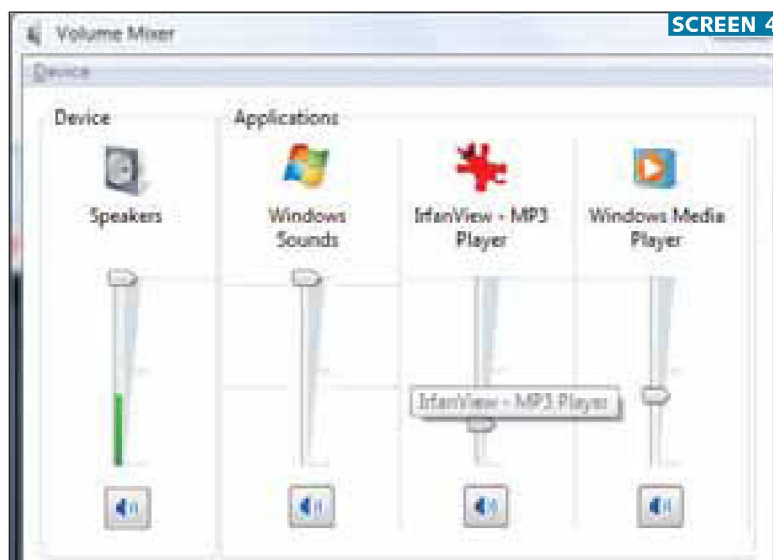
Ian Kirkby

Custom borders in a Word table cell

go to Format, Borders and Shading (see screen 5). Click the Custom button (bottom left) and choose Cell from the 'Apply to:' list (bottom right). Now choose the line colour, thickness and style from the central Style panel.

Next, in the preview panel click either the buttons or the border lines. One click replaces the standard border with the custom one, leaving the other edges with the standard border. If you want to remove those, click twice; the first click adds the custom border and the second click removes the border completely. You can format the borders of a row or column in this way by selecting it before opening the dialogue.

If you want to format non-contiguous cells, format the first and OK out of the dialogue. Move the insertion point to the next cell you want to format, then press Control and Y, repeating this for any other cells. **PCW**



Setting Vista's sound levels

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Networks networks@pcw.co.uk

Performance performance@pcw.co.uk

Sound sound@pcw.co.uk

Spreadsheets spreadsheets@pcw.co.uk

Visual programming visual@pcw.co.uk

Web development webdev@pcw.co.uk

Windows win@pcw.co.uk

Word processing wp@pcw.co.uk



Gordon Laing has been a hardware enthusiast since his first Sinclair ZX80 and as a former editor of PCW and contributor for over 10 years, what he doesn't know about technology isn't worth knowing.

→ Comments welcome on the Hardware column.

Email hardware@pcw.co.uk

Please do not send unsolicited file attachments.

When updates go bad

A solution to software update ills and how a plug-in can improve audio quality

In this month's Hardware column, I'm revisiting the topics of patching software and achieving audiophile sound, although this time with further warnings. That sound you can hear is the gnashing of my teeth.

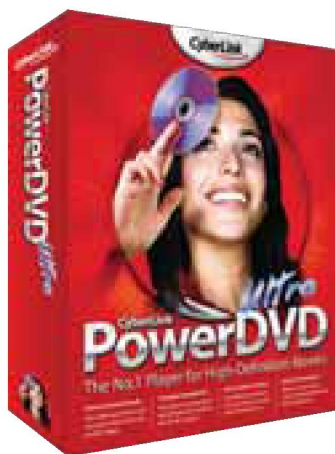
Troublesome updates

Regular readers of the Hardware, Performance and Inside Information columns will know I've had a number of issues with various software updates recently. Most notably, a failed Windows XP Service Pack 3 update rendered my otherwise happy Media Center Edition PC unusable without a complete reinstallation – suffice it to say I wasn't a happy bunny.

Indeed, it made me question the need for constant updates on a machine that may be at a much lower risk of viruses than a typical office system. Since I have two media PCs in different locations (one for recording, the other for playback only), I could take the step of not only disabling updates on the latter, but also disconnecting it from the internet altogether as it had no need to download the updated TV schedules.

This extreme proposition came one step closer to becoming a full-time reality when a PowerDVD update significantly reduced the usability of my recently reinstalled media PC.

I've long used PowerDVD for MPEG-2 decoding on DVDs and Media Center



recordings, and recently its ability to decode Blu-ray and HD DVD titles.

Most people who use PowerDVD to play HD DVD movies on their PC already know Cyberlink made the unpopular, albeit unsurprising, move of abandoning the defeated format in favour of Blu-ray exclusivity with version 8. So if you're currently using version 7.3 for HD DVD playback, resist all temptations to 'upgrade' to version 8 as you'll lose the ability to play your old discs. You have to be particularly careful since Cyberlink promotes an upgrade to PowerDVD 8 in some of version 7.3's setup menus.

After rebuilding my operating system following the botched SP3 update, I installed my original version of PowerDVD 7.3, after which I could once again play DVDs along with Blu-ray and HD DVD titles using my

Cyberlink's PowerDVD is a popular choice for decoding DVD and Blu-ray video, but anyone using version 7.3 should be careful about applying updates or patches

dual-format LG drive. But then PowerDVD informed me a patch was available that should be installed. After verifying it was a genuine 7.x patch, I thought it was safe to proceed.

Do I ever learn? The patch may not have disabled HD DVD playback, and it didn't even change the main version number on the splash-screen from 7.3, but it did result in two undesirable side-effects. First, when fast-forwarding or rewinding Media Center recordings, the picture froze in place, forcing you to stop, then resume playback before it would reveal where you were. Skipping adverts or even just forwarding through padding subsequently became impossible.

Frustrated, I decided to watch a nice high-definition film and popped a Blu-ray disc into the LG drive. Strangely though, the HD picture which previously filled my 1,920x1,080 pixel desktop had now fallen to a much lower resolution window framed with thick black bars. PowerDVD had detected that I wasn't using an HDCP connection to my display and was now down-converting the output.

The reason I don't have an HDCP-compliant connection is because my HD projector predates DVI and HDMI. It can display HD images, but only from an analogue source. Like other early adopters, I bought an HD projector and don't see why I need to 'upgrade' it to support a content-protection technology. I don't pirate films.

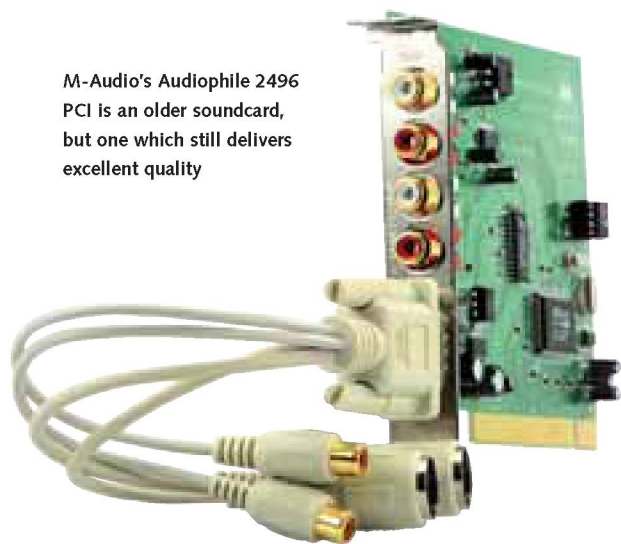
I know Hollywood wants me to retire a perfectly good display. Had I never been able to watch any digital HD content on it, I may have complied. But the thing is, prior to this patch my system let me enjoy the full glory of HD material from Blu-ray and HD DVD, whereas now it occupied a small window in the middle of the screen.

Luckily the fix was pretty simple: I uninstalled PowerDVD and reinstalled



LG offers a pair of optical drives that support both HD DVD and Blu-ray media and supplies them with PowerDVD 7.3 for playback of movies

M-Audio's Audiophile 2496 PCI is an older soundcard, but one which still delivers excellent quality



my original 7.3 version. HD movies now filled the screen again, and the mysterious 'winding' problem with recordings was resolved.

I have now become 'patch-averse', but, of course, not all of them are out to get you. The majority perform useful – or essential – updates. The question therefore, as asked by reader Alan Fry, is how to assess which should be applied and which avoided?

Following my previous comments that 'if it ain't broke, don't fix it', Alan wrote to suggest "paranoid home theatre PC users or those with a PC deemed mission critical" should turn off automatic updates and become disciplined to manually apply patches a week or so after their release, having first checked out whether early adopters are reporting any issues.

In theory, this could work if you had the time to check out the effect of each new patch, and remembered to do it regularly. This is beyond many of us, but, as far as I can see, it's one of the few solutions to patch problems that don't involve sticking your head in the sand and avoiding them altogether. That said, this is what I'm going to do now. My media PC, only used for playback, is going to be disconnected from the internet and run patch-free for a while.

This isn't a general recommendation by any means, but as time goes on it looks like being the best approach to maximise uptime for this particular system. As always, if you have an unconventional approach to patching, do let us know.

Audiophile sound

High-quality audio from PCs has been a popular topic in recent Hardware columns and I'd like to follow up an item described in April's edition. Then we published several reader letters extolling the virtues of the ageing, but

great-sounding M-Audio Audiophile 2496 card which is available for around £50 – at the time of writing, www.scan.co.uk had them in stock.

With a default installation, the AP2496 (as it's often known) can certainly deliver a boost in quality over basic audio cards and chipsets, but last month reader Steve Monks wrote to explain how a Kernel Streaming plug-in for Winamp could improve the quality further. The original plug-in, however, proved unstable at times. So, as a programmer, Steve got permission from the original author to take a look at the code and post a revised edition. Following further requests, he rewrote the plug-in which you can find at www.stevemonks.com/ksplugin.

I tried the plug-in with my own AP2496 last month and found it greatly improved the quality of the digital output and recommended it for anyone for wants to use their PC as a decent front end for hi-fi audio. What makes it so good for hi-fi audio, though, can result in some operational caveats with other applications that may rule it out for your system.

M-Audio's Delta cards cunningly bypass the mucking about of Windows' kernel mixer and therefore aren't affected by the standard Windows Volume control. Instead, to control the volume of the card's analogue outputs, you'll need to go into the dedicated M-Audio Delta Control panel and adjust it there instead. This may not sound like a big deal, but it can prove inconvenient for some applications.

Windows Media Center Edition 2005, for instance, uses the Windows volume control system, so if you install the AP2496 you won't be able to

adjust the volume using the standard remote control or infra-red keyboard's buttons – the volume will be fixed, and MCE somewhat unhelpfully displays 'Mute' where the slider used to appear. We did, however, find the remote volume control worked fine in Media Player Classic, which many enthusiasts use to play MKV files, among others. Anyone considering the AP2496 should also know there are more appropriate choices for gaming, and that 64-bit Vista drivers are currently in beta form only.

Ultimately, you can use an AP2496 successfully in a system running MCE, but for greatest convenience and quality you'll need to set the Control Panel volume to its maximum and adjust the overall volume from an external pre-amplifier/receiver/audio processor using its controls.

Finally, thanks to Ion Mitchell, who after reading about the modifications performed by US-based Bolder Cable (www.boldercables.com) to my Logitech Squeezebox, suggested a UK company that offered audiophile modifications. The SB+ from UK-based At-tunes (www.at-tunes.co.uk) is not so much a modified Squeezebox as a completely rebuilt unit. The company keeps the front end of the Squeezebox 3, which communicates with the network and PC, along with providing the display and user interface, but disconnects the clock, digital and analogue circuitry and fits its own boards along with improved voltage regulation and a separate linear power supply.

The rebuilt Squeezebox and power supply are fitted into custom cases. The SB+ is built to order and costs £1,000, which includes a Squeezebox 3 for the modifications. **PCW**

The SB+, from UK-based At-tunes, takes the popular Logitech Squeezebox 3 and rebuilds it for serious hi-fi performance





Gordon Laing has been a hardware enthusiast since his first Sinclair ZX80 and as a former editor of PCW and contributor for over 10 years, what he doesn't know about technology isn't worth knowing.

→ Comments welcome on the Performance column.

Email performance@pcw.co.uk

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Editing HD footage

How to get around the editing problems posed by high-definition video

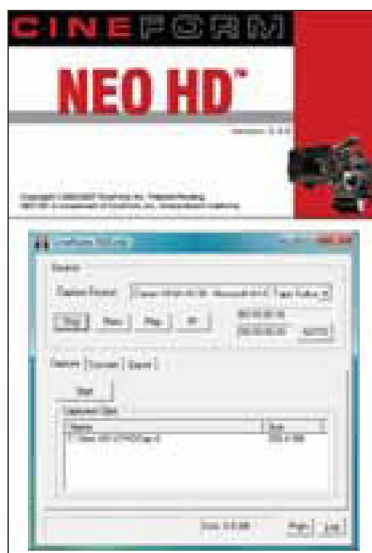
If you thought playing HD video on your PC could be demanding, wait until you try to edit it. As an increasing number of consumer cameras capture HD content, more of us are discovering this footage is a serious stumbling block for even the latest hardware configurations.

The biggest problems lie with the latest generations of camcorders and still cameras, which compress their footage into a variant of the MPEG4 compressor such as H.264 or AVCHD. These formats are efficient at storing and transporting HD material, but they were never designed for editing.

AVCHD and H.264 are complex formats that require significant processing muscle just for smooth, linear playback, so it's not surprising that editing them in a non-linear application is going to cause problems. If you try to edit these formats on most PCs, you'll suffer from an infuriatingly choppy experience where precise editing points are almost impossible to set and smooth real-time previews are out of the question.

As discussed in the March 2009 Inside Information column, the traditional solution of throwing greater processing muscle at the problem just won't work either – yet. Today's fastest processors, even coupled with stacks of Ram and quick Raid arrays, are still insufficient for delivering the kind of responsive editing experience with AVCHD and H.264 that we've become used to with Mini DV.

However, this doesn't mean anyone who received an HD camera at Christmas has to wait for hardware to catch up before they can edit footage without tearing their hair out. The answer is to take inspiration from the pros and forget about trying to edit HD in a native acquisition format such as AVCHD. Instead convert it into something that's more editing-friendly.



Cineform's software converts HD footage into the company's intermediary format for quicker editing and exporting

Intermediates

Professional video editors have long relied on intermediary formats, which accelerate the editing process and the speed of final export times. A separate program will convert existing files or perform the conversion during the capturing process. The intermediary files are then dropped into the timeline of your editing application as normal. Some editing applications can even create the intermediary files for you.

The milder compression used by intermediary files means they will occupy more space on your hard disk, but the files are often dispensed with after the editing process anyway.

There are plenty of programs that convert video from one format into another, but at the time of writing most of those specifically designed for accelerating HD editing were aimed at the professional, or at least higher-end enthusiasts. As more consumer capture devices offer highly compressed HD, we can expect to see more affordable solutions arrive.

Cineform (www.cineform.com) recently released Neo Scene, which

costs \$129 (approx £90) and converts AVCHD and HDV content into the company's intermediary format for quicker and more responsive editing. The process is handled by the HD Link program (see screen, left), which can either convert existing files or capture new ones directly from the camera, converting them in real time. I've started trialling Neo Scene along with its bigger brother Neo HD and will report back in a future edition.

Converting while you capture footage from a camera is a convenient way to avoid a later conversion stage. Black Magic Design's Intensity card, as featured in the March 2009 Performance column, captures footage over HDMI and stores it in the editing-friendly Motion JPEG format; the card costs \$249 (approx £175) from www.blackmagic-design.com.

Applications that incorporate intermediary technologies include Apple's Final Cut Pro 6 (for Macs only), which is one of the most effective with its Prores 422 format. Sony's Vegas Pro is also reported to work well with AVCHD content.

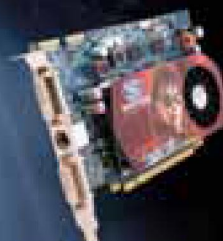
It's still early days for trouble-free editing of AVCHD and H.264 material, with many pros or enthusiasts continuing to rely on older tape-based HDV cameras for the best experience. HDV uses MPEG2, which may also be less than ideal for editing, but it's a great deal more acceptable than working with the newer formats.

MPEG4 variants are here to stay and will soon dominate all consumer HD footage. Effective editing solutions will become common and the frustrations of early adopters should hopefully be a thing of the past.

I'll be looking at the performance of various editing solutions in future columns, but if you're successfully editing HD footage – or need a shoulder to cry on – drop us a line. **PCW**

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ON THE 8GB DVD

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COVER DISC

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disc-support@pcw.co.uk

PHONE: 020 7316 9706
(10am to 6pm Mon-Fri)

Note that we cannot give support for programs on the disc

SOFTWARE LISTING

ON THE CD

5 FULL VERSIONS

Magix Music Maker 15 Silver
Agnitum Outpost Security Suite 2009
Conceptdraw Project
Laplink Everywhere 5
Prodad Heroglyph Rapid

37 FREWARE

7-Zip 4.65
Agnitum Spam Terrier 2.0.164
Artweaver Portable 0.5.7
Auslogics Registry Defrag 5.1.18.445
Batterybar 3.0.48
Bullzip PDF Printer 6.0.0.744
CCleaner 2.16 Portable
CPU-Z 1.5
Efficient Diary 1.0
Efficient Password Manager 1.0
File Hamster 1.7
Firebug 1.3.2
Flooda 4.7
Fresh Diagnose 8.0
Google Earth 5
Internet Explorer 8 RC1 for Vista
Limewire 5.0.11
Microsoft Internet Explorer 8 RC1 for XP
Microsoft Live Search for Firefox
2009.01.24
Miranda IM v0.7.14
Mobile Me for Windows 1.3
Networx 4.6.3
Noscript 1.9
NSIS 2.43
PC Tools Threatfire 4.1

PDFCreator 0.9.7
Pictomio 1.2.27
Postbox 1.0b7
Quicksys Reg Defrag 2.3
Recuva Portable 1.23
Spam Fighter Standard 6.4.44
Transmute 1.10
Tweak Vista 1.5
UltraDefrag 2.1
Viorb
Walyk Wallpaper Changer 1.4
Wink 2.0.1060

5 FROM THE MAGAZINE

Iolo System Mechanic 8.5
Microsoft Visual Web Developer 2008
Script.aculo.us 1.8.2
Tune-up Utilities 2009
Uniblue Speed Up My PC 2009

15 SHAREWARE

AuctionX2 1.1.0.72
Auslogics Boost Speed 4.3.9.185
Beyond Compare 3.0.14
Everest Ultimate 5
Fineprint 6.06
GoodSync 7.6.5
JV16 Powertools 2009
NovaPDF 6.1
Password Depot 4.0.3
Sugarsync 1.5
Synchredible Standard 2.3
The Bat 4.1.11 Professional
Total Uninstall 5.2.0
Window Blinds 6.4
WPanorama 9.3.1

3 TRIAL SOFTWARE

Agnitum Firewall Pro 2009 v6.5
Stuffit 2009
Trend Micro Internet Security 2009

ON THE 8GB DVD

EVERYTHING ON THE CD PLUS...

1 FULL VERSION

Conceptdraw Pro 7

5 FREWARE

A-squared Free 4.0.0.38
Antivir Rescue System 02 2009
JAlbum 8.1.6
Kaspersky Anti-Virus Tech Preview for Windows 7
Miro 2.0

1 FROM THE MAGAZINE

Acronis True Image Home 2009

4 LINUX & OPEN SOURCE

Knoppix 6
Linux Mint 6
Mandriva 2009.1 One
Parted Magic 3.6

RESOURCES

(OVER 100 APPS, 11 CATEGORIES)

Audio, video & photo
Backup, restoration & file management
Browsers, managers & extensions
Burning & media
Business, office & collaboration

Chat & communication
Developer & web development tools
General utilities
Internet, networking & Wifi tools
Optimisation & diagnostics
Portable applications
Security

6 GAME DEMOS

Air Bandits
Burnout Paradise Ultimate Pack
Ceville
Grand Ages Rome
Hotel Giant 2
Lincity-NG v2

3 TRIAL SOFTWARE

Conceptdraw Office
Norton Internet Security 2009 (60-day)
Pinnacle Videospin 2

3 SHAREWARE

Devicelock 6.3
Microsoft Songsmith 1.01
Apple Quicktime 7.6

THE UK'S BIGGEST & BEST SOFTWARE COLLECTION!

USING THE COVER DISC

The PCW cover disc uses a web browser-style interface. To get full functionality, you'll need to use Microsoft Internet Explorer (version 5.5 or later). Unfortunately, Netscape doesn't properly support this software. However, we have also provided links to the featured programs, so you can still copy them to your hard disk or install them manually (the standard download dialogue box will appear). Programs can be found in the \software\ folder on the disc.

STARTING THE DISC

The CD-Rom (or DVD) should auto-start. If it fails to do so, double-click the CD-Rom/DVD icon in My Computer or open the terms.htm file on the root of the disc.

PROBLEMS?

We cannot give support on programs on this disc. If you have problems running the disc, follow these guidelines:



PROBLEMS INSTALLING/RUNNING THE SOFTWARE

Check the support page on the disc or check the manufacturer's site.

GENERAL DIFFICULTIES

For details on cover disc support and frequently asked questions about the discs go to www.pcw.co.uk/disc-support. For faulty or damaged CDs/DVDs please email disc_support@pcw.co.uk for a replacement, giving the details requested on the website. If you have no internet access, call 020 7316 9706 between 10am and 6pm Monday to Friday. Please note that PCW cannot give technical help/support.

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These products are licensed for personal use on only one PC at a time. You may not rent or lease or resell products contained on this DVD or use them for public performance. Neither the suppliers nor the publisher will accept responsibility for any losses or damage resulting from use of this software, including any loss of profit, damage to equipment, interruption of business or data or any other damage direct or accidental.

It is recommended that you back up any programs and data on your hard disk before installing this software. PLEASE READ INSTALLATION AND SYSTEM REQUIREMENT INSTRUCTIONS CAREFULLY BEFORE USING.

The publisher, Incisive Media, has checked this DVD-Rom for known viruses at all stages of production, but you are advised to check all programs and discs accessed on your PC yourself before using them, with an up-to-date virus scanner.

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Magix Music Maker 15 Silver

Compose professional-sounding songs or soundtracks quickly

There are two routes to musical success. The first requires talent, learning an instrument and spending years writing dull songs until you finally create one that's any good. This sounds too much like hard work.

The second? Compose your own tunes in minutes with an automatic sequencing tool such as Magix Music Maker 15 Silver, even if you have no musical talent or knowledge.

The process starts with you browsing the list of professionally recorded samples. Listen to each drum loop until you find one you like and drag and drop it onto the work area. Add a bass, synth, guitars, even vocals, and Magix Music Maker 15 Silver will continually loop through your song so you can hear how they work together. If you don't like something, you

can remove the sample and try something else.

There are only a limited number of samples, so realistically you're probably not going to create a major international hit in the first 15 minutes. But if you want to create a basic soundtrack for a home or online video it won't take long. Just combining three different samples can be enough to create an atmospheric loop.

You can import tracks directly from an audio CD and these can be customised by adding your choice of samples.

When you've finished it's time to export the results. Magix Music Maker 15 Silver saves to all the most useful audio formats – MP3, WMA, OGG, WAV, AIFF, so it's easy to share your work with friends or import it as a soundtrack in your video editor or other software.

INFORMATION

System requirements Windows 2000, XP or Vista

Contact www.magix.com/uk

Registration Not required

Need to know This Silver version of Magix Music Maker 15 contains a limited number of samples

Compose a simple video soundtrack in minutes



1 Launch the program, click Start New Arrangement and choose the style you'd like to use: Rock or Electro (if you're not sure we'd recommend Electro). Now look at the bottom of the program work area, choose an instrument group – sequences, say – then select one sample, and click it again to hear what it sounds like.



2 The Electro Sequences 'Sawmill' loop sounds intriguing, so double-click that to add it. Drag the right edge to make the loop repeat for more bars, then add a sample on track 2 to make it more interesting – the Rumblebee bass loop is a good choice. Click Play if the tune isn't playing already to hear how this sounds.



3 Just adding a third sample (Pads > Goblinpad) is enough to produce a simple, moody soundtrack, but if you want it to run for several minutes then include a few more to prevent your listeners from getting bored. When you're done, click File > Export, choose an audio format, save your work and share it with the world.

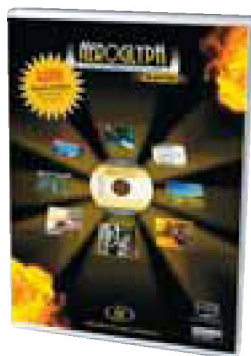
UPGRADE OFFER

NEW FEATURES

Supports 96 tracks
2,000+ sound loops
12-voice virtual synth
Import MP3s
Mix to 5.1 surround sound
Publish to Youtube

MAGIX MUSIC MAKER 15 PREMIUM

Moving to Magix Music Maker 15 Premium gets you an extra 2,000 sound loops for even more creative possibilities, and you're able to arrange them over 96 tracks. A 12-voice virtual synth helps you create custom loops of your own, and you can import MP3s for even more material. When you're finished then mix to 5.1 surround sound for the best-quality results or publish directly to Youtube from within the program to let everyone else hear what you've done. The download version is yours for £74.99 and you can find out more by clicking the Upgrade button.



INFORMATION

System requirements Windows 2000/XP/Vista, 105MB hard drive space

Contact www.prodad.de

Registration Click Help > Register > Next, fill in your details, and the program will send them via email (send your data to info@prodad.de if this doesn't work). You'll receive a response within 48 hours.

Prodad Heroglyph Rapid 2.6

Create truly professional video titles with special effects

Most video editors concentrate their resources on the body of your movie, providing the tools to make it look as good as possible. The titles are an afterthought. You'll be able to choose a font, enter your text and apply a few effects, but the end results will only ever look ordinary. If you need extraordinary then it's time to try a specialist titling application such as Prodad Heroglyph Rapid 2.6.

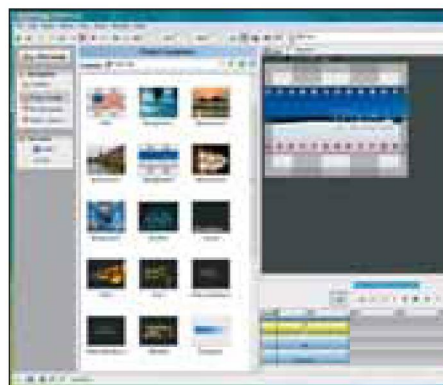
You've probably seen TV ads and movies where huge titles fly between buildings in a cityscape, for instance. There's no chance of achieving that kind of effect with most video editors, but it's not a problem for Heroglyph Rapid. You simply construct layers, where the base is the main city photo, your captions float

over that, and a building (with some transparency) is added in front. Apply a 3D effect to the text, scroll it across the screen, and it will appear to pass in front of some buildings, behind others.

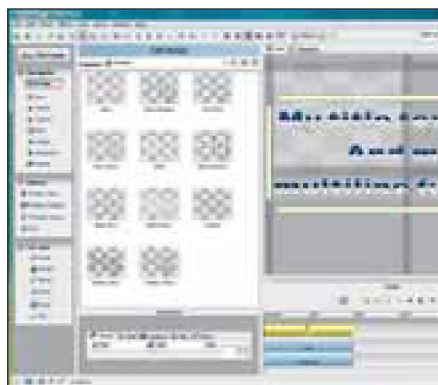
It's just as easy to apply the same principle to your own images. If you're introducing a movie of your holidays you could use a picture of the family on the beach as the base layer, add one or two family members on top, and have your titles fly through the group.

If that doesn't appeal there are many other options: video walls, picture-in-picture options, slideshows in 3D space, animated text or objects following a path. There's still the standard *Star Wars*-style scrolling text templates and the results can be exported as images or AVI files.

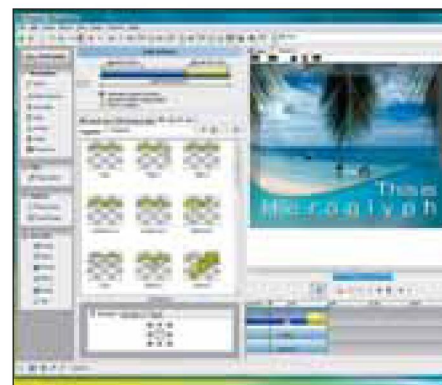
Getting started with Prodad Heroglyph Rapid 2.6



1 Heroglyph Rapid is capable of some very advanced effects, but we recommend you start with something simpler initially, just until you get familiar with the basics. Launch the program, click New Project > Choose a ready-to-use template > Templates for more than 30 prebuilt examples.



2 Double-click the template design to see a video animation. No good? Click Edit > Undo and try something else. When you're happy, click the animation to see the Edit screen. Now click the text and type your own caption, then choose your text style, opacity, rotation and more.



3 Click the Sequence tab to see how the titles look so far, and optionally apply fade in and fade out effects for the title (check the timeline to see how these effects are layered over the background and other images). Then click File > Export and save your titles as an AVI video or still images.

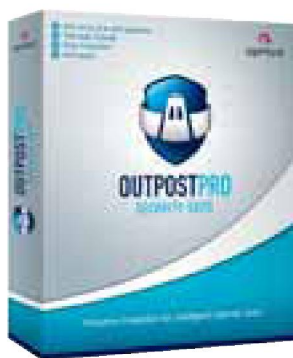
UPGRADE OFFER

NEW FEATURES

- Support more text movements
- Control objects in 3D space
- Configure form, surface, contours
- Adjust angles, rotations, scaling
- Many more title designs
- Many user interface enhancements

PRODAD HEROGLYPH

Try Prodad Heroglyph and you'll discover many more titling effects. There's support for natural movements such as acceleration, deceleration, bounce, spring and oscillate, for instance. You get detailed options to control the movements of text in 3D space. It's easy to tweak the form, surface, contours, shadow, perspective and opacity of objects. And if that is all too complicated, just choose from the additional bundled title designs. Visit www.prodad.de/gb/heroglyph_std_details.html for more details.



INFORMATION

System requirements Windows 2000 SP3 and above/XP (32/64-bit)/Vista (32/64-bit), 100MB free disk space

Contact Agnitum www.agnitum.com

Registration Visit www.agnitum.com/promo/ computer-active and enter the promo code 2SNVC-LQ97L-GSKC8-884SK-CWBAY to get your free registration key. The licence will last six months.

Agnitum Outpost Security Suite

Powerful and configurable protection from most internet threats

With Outpost Security Suite Pro 2009 there is no module to securely delete confidential files, and you won't discover any PC optimisation tools. The focus is on protecting you from internet threats.

There's no shortage of features to explore, though. An intelligent anti-virus engine examines modified portions of the file system to avoid repeat scans of unchanged files, which delivers a major improvement in scanning speeds. It also makes minimal use of system resources to reduce impact on other programs.

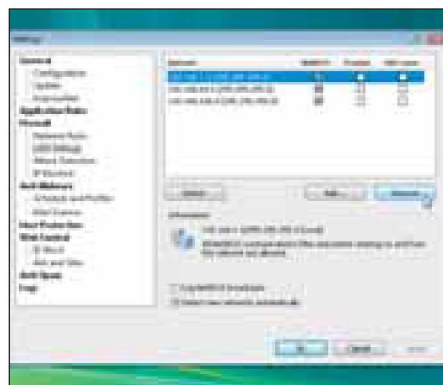
You also get substantial real-time malware protection. Programs are scanned for potential threats before they're launched and the Host Protection module monitors program behaviour to spot dubious behaviour, detecting some new

dangers even before they're added to the signature database.

A two-way firewall protects your internet connection. An intrusion detection system and special Ethernet protection shield you from man-in-the-middle attacks and any hackers trying to access your wireless network.

There's also a Web Control module, which steers you away from malware-infested sites, prevents the inadvertent disclosure of your personal information and keeps you safe from identity thieves. A Bayesian anti-spam module clears the junk out of your inbox. And this all happens with minimum of hassle. Outpost Security Suite Pro 2009 uses many techniques to reduce the number of alerts requiring your involvement so you get on with your work.

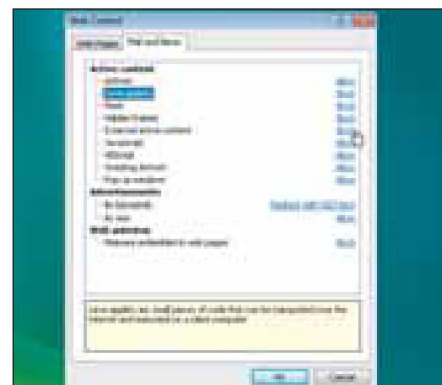
Tweak Outpost Security Suite Pro 2009 for the best possible results



1 Install Outpost and it tries to detect your network, to ensure the firewall doesn't block access to local systems. But has it got this right? Double-click the Outpost system tray icon and click Settings > Firewall > Lan Settings to make sure it has detected the correct systems, and adjust the values if necessary.



2 Click Schedule and Profiles. By default Outpost schedules a daily Quick Scan at 1am, but this might not be convenient. Select the scan and click Edit to run it at a different time or frequency (hourly, daily and weekly are supported), or click New if you'd prefer to schedule a full scan instead.



3 Click Web Control > Customize to see the web content that Outpost can block. Not interested in Java, ActiveX or Flash applets? Click their 'Allow' links and set them to 'Block'. It's just as easy to block active content in emails, an even better idea as there are few legitimate reasons to use them.

UPGRADE OFFER



EXTEND YOUR OUTPOST SECURITY LICENCE

Install Outpost and it will keep your PC safe from harm for a whole six months, but if you want to continue to use it after that you'll need to purchase a renewal licence. But don't worry – it's much better value than most of the security suite competition. A single-user 12-month licence currently costs around £16, and you can read more or place your order at www.agnitum.co.uk/?page=prices&sub=renew.



Conceptdraw Professional 7

A one-stop vector graphics tool with competent, stylish features

Conceptdraw Professional 7 is one of the most powerful and versatile tools for creating technical drawings. Install the program, browse the list of document templates, and see what this program can do.

You get all the symbol libraries you need to design flowcharts and organisation charts, for instance. We don't mean the usual bland black and white charts, either. These can have stylish backgrounds, borders and frames, and colourful boxes with drop shadows and gradient fills.

Conceptdraw Professional 7 can help you produce a floor plan for your new home. Draw the building core – walls, windows, doors, stairs – then add dimensions, internal walls and lay out every room with your choice of furnishings (there are 27 different types of table).

Perhaps you're looking to create something a little more artistic? The program has a very competent set of vector drawing tools, and can be used to create anything from maps to landscape garden designs, even clipart.

There's a useful set of business diagram templates, including Venn diagrams, comparison charts, pyramid graphs and more. And help on producing almost any other drawing, from electrical engineering circuits to TQM diagrams, fishbone charts to database models.

Designing your diagram is as easy. Just drag, drop and rearrange the symbols you need. Each symbol can be customised with a rich set of Cad-like properties, and the finished chart can be exported in a wide range of formats (JPG, PDF, PPT, HTML, SWF and more) ready to share.

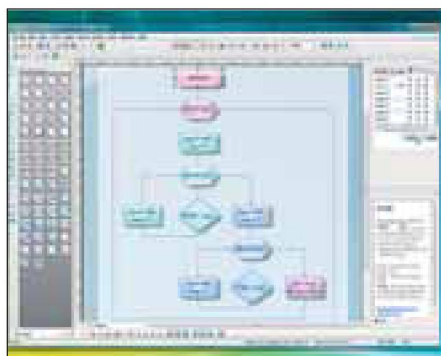
INFORMATION

System requirements Windows XP or Vista, 540MB hard drive space

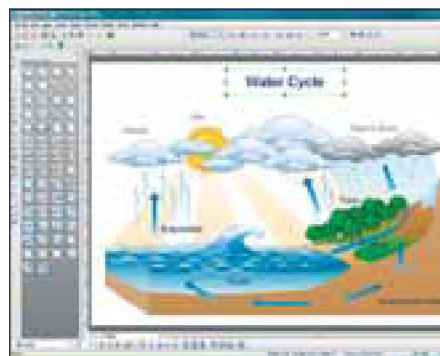
Contact www.conceptdraw.com

Registration Get your free serial number from www.conceptdraw.com/registration/cd7special.php?iml_uk

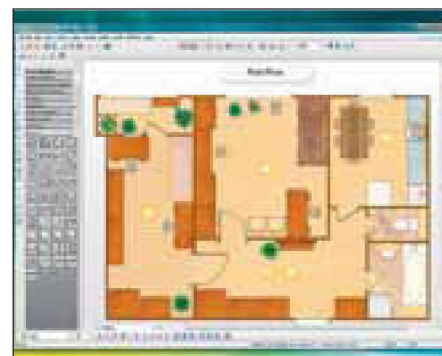
Three reasons to install Conceptdraw Professional 7



1 Conceptdraw Professional's flowcharts aren't just functional, they look great, too. You're able to customise the box line style, colour, shadow, rounded corners and more, and the visually impressive results would be an asset to any presentation. You can export the chart as a Powerpoint file, too.



2 There's much more to this program than flowcharting, though. It's also a very useful vector drawing program, with line, sector, arc and spline tools combining with the predefined shapes to produce excellent results. This 'Water Cycle' sample chart wouldn't look out of place in a textbook.



3 But open another set of symbol libraries and Conceptdraw Professional 7 turns into another program altogether. Rearranging your flat, for instance. The program comes with more than 50 related floor plan libraries, covering everything from sofas to lighting, potted plants and plumbing.

UPGRADE OFFER

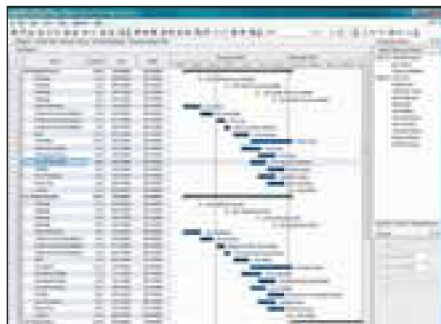
NEW FEATURES

Many new flowchart symbols
Windows Vista interface library
Ribbon interface library
Extended layout options
Improved printout quality
Faster and more reliable

CONCEPTDRAW PROFESSIONAL 8

Move to the latest version of Conceptdraw Professional and you'll find a faster program, with more flowchart symbols, and extra libraries including the Windows Vista and Ribbon interface. A comprehensive set of object positioning operations assists in laying out your diagram correctly, and new chart properties deliver even better print quality. The list price for Conceptdraw Professional 8 is £169, but as an upgrade you need pay only £89, saving almost 50 per cent. Visit www.conceptdraw.com, browse to the Conceptdraw Professional product page and follow the Upgrade link to learn more.

Conceptdraw Project 4



INFORMATION

System requirements Windows XP or Vista, 540MB hard drive space

Contact www.conceptdraw.com

Registration Obtain your free www.conceptdraw.com/registration/prj4special.php?iml_uk

Conceptdraw Project 4 comes with lots of sample projects to help you figure out how it works

If you're planning to move house, get married or organise a holiday for a group of friends, the chances are that Conceptdraw Project 4 can help.

To start the process you'll need to create a list of tasks, along with estimates of when each one will start and end. This immediately gives you a better idea of what your project actually involves. A task that begins 'plan wedding reception' might expand to 'compare possible venues', 'get quotes', 'decide on menu', 'find caterers' and more.

Some of these tasks may become expensive, but you can add costs as you find out what

they are. The program will then keep you up to date with exactly how much you'll be spending to make this project happen. Other tasks might require resources, such as a van or a helpful friend.

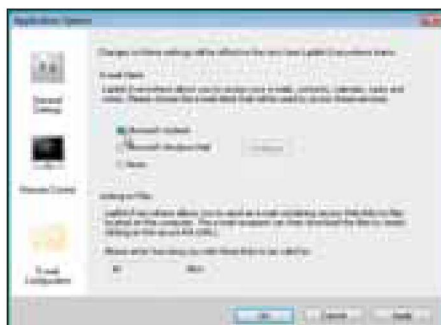
Conceptdraw Project 4 delivers useful reports here, too, so you can easily see who's doing the most work, or if you've scheduled one person to do several things at once.

Best of all, it's easy to share your project plan in the form of Gantt charts, calendars, web pages and more, so everyone can see what you're doing to help keep the project on track.

UPGRADE OFFER CONCEPTDRAW 5

The latest version of Conceptdraw 5 adds a cost indicator to the status bar, so the state of your budget is always visible. It's easy to produce attractive new graphical reports, or email project mindmaps to project participants. The main project dialogue has been redesigned to help you work with task-related information in a more effective way. The list price for Conceptdraw 5 is £169, but as a licensed owner of version 4 you can upgrade for £69. Visit www.conceptdraw.com, browse to the Conceptdraw Project page and follow the Upgrade link to read more.

Laplink Everywhere 5



INFORMATION

System requirements Windows 2000/XP (32/64-bit)/ Vista, (32/64-bit), 18MB hard drive space, always-on internet connection

Contact www.laplink.com

Need to know This is a trial version of Laplink Everywhere and the full remote access features will expire 30 days after installation.

Laplink Everywhere 5 can remotely access your emails on Outlook 97, 98, 2000, 2007, Outlook Express and Windows Mail

Your PC is packed with useful information and that can be a problem if you suddenly discover you need a particular file when you're far away from home. Laplink Everywhere 5 can help, though, by providing speedy remote access to your PC from almost anywhere in the world.

The process starts by installing Laplink Everywhere 5 on your home PC. Launch the program, enter a user name, password and other security information and it'll create an online account for you.

Leave your PC running – with an available internet connection and Laplink Everywhere 5 host running in the background.

If you need a file on your system, find the nearest internet-enabled PC, visit the site <http://lle5.ll2go.com> and log in. You can search your hard drive for the document and email a link to it in just a few clicks.

Laplink Everywhere 5 also works on any mobile phone with a browser (Windows Mobile 5 and 6, Symbian, BlackBerry, iPhone and more).

If you have a laptop you can install the Laplink Toolbar, an Internet Explorer add-on that can search your remote PC, send and transfer files, browse your emails, and launch full remote control sessions. The remote Outlook option is particularly handy, giving you one-click access to your emails, contacts, notes, calendar and more.

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This version of Laplink Everywhere 5 provides all the remote access features you need for 30 days, but after that you'll be restricted to searching for and downloading whatever files you need. Not good enough? Then you'll need to upgrade your Laplink Everywhere account. 12 months' remote access to one PC costs £34.95, or you can spend £69.95 and access up to three PCs. Log in to your account at <http://lle5.ll2go.com> and click Upgrade. Then place your order.



Tim Nott is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family.

→ Comments welcome on the Windows column.

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A question of priority

How to manage programs and processes with the Task Manager

You may sometimes find that certain processes hog CPU cycles to the detriment of other programs and general Windows performance. Examples that have reached the ears of this column include Lotus Notes, Windows Media Player, Internet Explorer and some webcam software.

If you find Windows inexplicably slows down at times, it's worth taking a look at the Task Manager. In Vista, press the Control, Alt and Delete keys all at the same time, then choose 'Start Task Manager'; in XP, that key combination takes you straight there. The Applications tab shows you what you've got running on the desktop – that is, programs or folders you have opened yourself. If you turn to the Processes tab, however, you'll get the whole story, with all background tasks, services, System Tray items and so on appearing in the Image Name column.

The next column lists the user who 'owns' the process. Normally this will either be you, System, Local or Network Service, but if you've got more than one user account on your PC and have switched users, rather than logging off, you will see what the last user left running if you tick the 'Show processes from all users' box.

The headings work like Windows folders, so you can click on one to set the order (see screen 1). The next two columns show CPU and Memory Usage; again, you can click on the headings to see, for example, the highest CPU usage. You'll see the list rearrange itself as processes take more or fewer cycles, but if you see something persistently gobbling CPU time then that could be causing a problem. If it's from another user, then you can force a log off from the Users tab, but they will lose unsaved data. A better way is to switch users, save any open files, close down running

programs and log the user off. Log back in to your own account and you should find the problem solved.

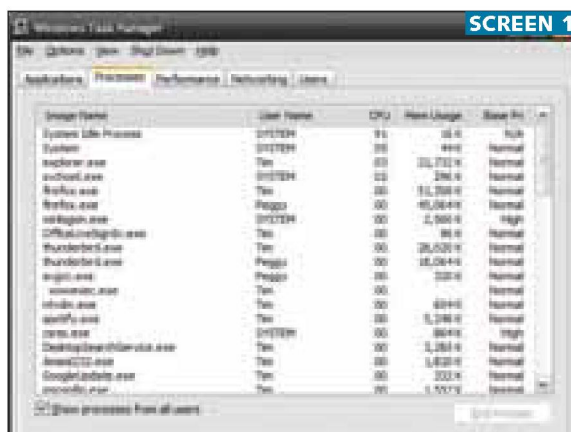
If there's still hogging from one of your own processes, then you can kill it by right-clicking on the item and choosing 'End Process'. This is a drastic move, as the process might be essential or you may lose data, and you will get a warning to that effect. A better move is to change the priority of the process – right-click on it, Set Priority, and choose Below Normal or Low (see screen 2).

There are a few useful tips with the Task Manager. First, if you've got the CPU column order selected, you may find the constant list rearrangement makes it hard to keep track of a particular process. If you go to the View menu, you'll find you can set the Update Speed to low, which results in less frenetic rearrangement. From the same menu, you can also choose what information you want displayed in the columns. Most of this is not very useful to the end user, but it can help to have the Base Priority visible. You can also drag column headings horizontally to reorder them. There's a little gotcha built in to the Task Manager. Double-clicking in the frame of a tab maximises it within the limits of the Task Manager window and all the other tabs disappear. Another double-click, however, restores the multi-tabbed view.

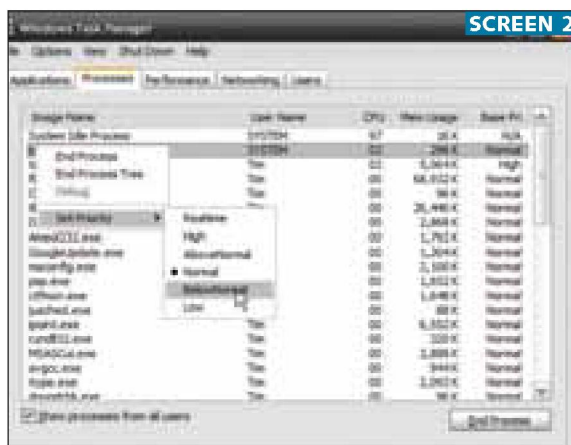
Changing the priority of a process in Task Manager only works for the current session. If you close and restart a program, it will be back with normal priority. It is possible, however, to run a program with low (or high) priority from a command prompt. Try, as an experiment, opening a command window and typing:

```
start /low notepad.exe
```

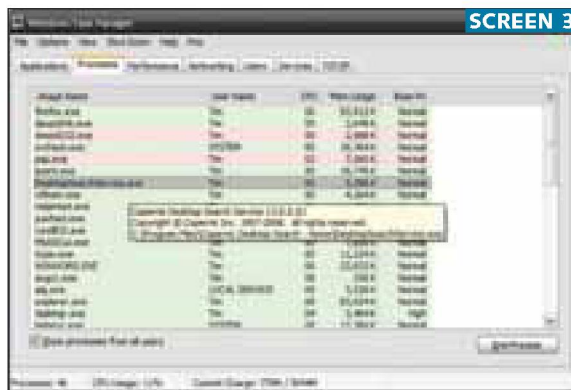
Notepad will open normally, but you'll see in Task Manager that its



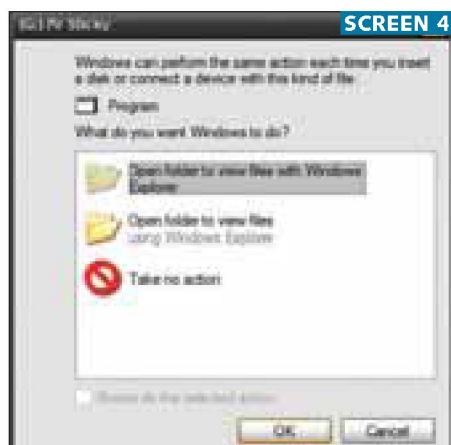
Showing all users in Task Manager and their CPU usage



Changing a task's priority



Prio adds enhancements to Task Manager



Action=Open folder to view
files with Windows Explorer
Icon=%systemroot%\system32\%
shell132.dll,4
open=worm.exe

(Key: % code string continues)

The 'Action' line is the text in the Autoplay dialogue. The 'Icon' line fetches an open folder icon from the system32 folder, and the 'Open' line points to the payload. Obviously there need not be any correlation between 'Action' and 'Open'.

Several organisations, including the Pentagon, have banned the use of USB keys. On a personal level we don't think it necessary to take your USB key out and shoot it, but it could make sense to disable Autorun on your PC.

Under Vista, you need to be logged in with administrator status. First go to Control Panel, Programs and Features, Installed Updates and make sure you have the Security Update KB950582 installed. It should have arrived with Automatic Updates but if not you'll find it at www.tinyurl.com/ckrdpn.

Next, run Gpedit.msc and expand Computer Configuration, Administrative Templates, Windows Components, Autoplay Policies. Double-click the 'Turn off Autoplay' entry, then select 'Enabled', then choose 'Turn off Autoplay on: All drives' (see screen 6). Restart and you'll find nothing Autoplays or Autoruns. If, instead, you enable the Default behaviour for Autorun item and set it to 'Do not execute any autorun commands' you'll find that media CDs and DVDs autoplay and other removable media, such as USB sticks continue to show an Autoplay window. Autorun.inf files, however, are ignored, and that fake 'Open...' entry will no longer appear.

The XP faithful also needs to be logged on as an administrator, and need the KB950582 update. Despite having Automatic Updates configured on the Hands On computer, this one needed to be downloaded from www.tinyurl.com/6y9v4e and installed manually. Having done this, and rebooted, run Gpedit.msc and expand Computer Configuration, Administrative Templates, System. In the right-hand pane double-click 'Turn off Autoplay' and as with Vista, enable for all drives. Unlike Vista, you don't get the separate Autorun setting, so it's all or nothing. And if you're running XP Home, you don't have the Group Policy Editor. Next month we'll look at hitting the metal in the Windows Registry. **PCW**

priority is set to low, rather than normal. However, this doesn't seem to work for all programs. Although it is theoretically possible to create shortcuts to run programs with non-standard priority – for instance in the Startup folder – this again is complicated and unreliable.

So, browse to www.prnwatch.com/prio.html and download Prio, which is free for personal use and enhances Task Manager in a variety of ways. First it

Above left: A dodgy dialogue in XP...

...and in Vista (above right)

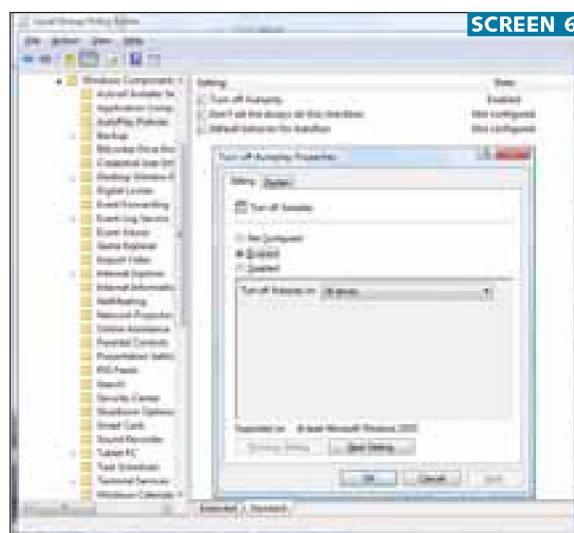
Autorun away

Recently there has been much concern over the Conficker virus, also called Downadup. Despite the fact that Microsoft released a security patch last October, by late January over nine million PCs had been infected, according to the security software company F-Secure. One way the virus spreads is through USB sticks and 'social engineering', which is a posh name for conmanship. Have a look at the screenshots of the Autoplay dialogue in XP and Vista (see screens 4 and 5). There's something not quite right – why are there two commands to open the folder in Explorer? And why has XP got 'Program' at the top and Vista 'Install or run program'? How many of us, in a hurry, wouldn't spot these suspicious signs and click on the first 'Open folder...' item?

In fact, that entry runs a program. We made a harmless 'booby-trapped' USB key, containing an executable file (a copy of Notepad.exe renamed to worm.exe) and an Autorun.inf file. The latter is just a text file created in Notepad, containing the following:

[Autorun]

Configuring Vista's Autoplay behaviour



'If you find Windows inexplicably slow, look at the Task Manager'

adds two extra tabs, Services and TCP/IP. The first of these shows most of the information you see in Administrative Tools, Services. You get a list of services, whether they are running and tooltip descriptions. You can start and stop services and change the way they are started. The TCP/IP tab shows all open ports and TCP connections. You get tooltip description and you can right-click and go to the process that established the connection.

It's back in the processes tab that the really useful stuff lies. For a start, processes are colour coded – those whose executable has a digital signature are shaded green and those without, pink. If there is a process without a signature but that you are certain is trustworthy, then you can add it to the green list. You also get a tooltip for each process showing information about the executable and its location on your computer (see screen 3). The best bit, however, is when you right-click on a process and choose 'Set Priority', as added to the list of priorities is an entry to 'Save Priority'. Check this and whatever priority you accord a process will be preserved when you close and restart it or reboot your PC.



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Duplicating partitions

How to use dd and ddrescue to back up your data

A few months ago we looked at duplicating partitions as a way to back up your data. A number of readers have expressed an interest in knowing more about this, so I'm going to look at it in a little more detail this month.

As a reminder, we used the 'dd' and 'ddrescue' tools to perform a cloned image backup, and the 'partimage' tool to create a special image format. The difference between the two types is as follows: the first copies every single byte of raw data from the hard drive's partition, thus creating a backup image of exactly the same size; the second copies only the used data from the partition and then compresses the result, leading to a much smaller file.

With the first method, the type of filesystem you are backing up is irrelevant, as a duplicate of the original is made. With the second method, the partimage tool must be able to understand the filesystem used on the partition in order to extract and back up only the used data.

The 'dd' and 'ddrescue' tools will copy data from any source to another, byte by byte. This could even be a single regular file, thus doing the same job as running the 'cp' command. Linux and other Unix-based systems treat everything as a file, and so a partition, or indeed a whole hard drive, can be duplicated in the same way. It is therefore possible to clone a hard drive, either as a backup, or to use the second drive in another machine. An example command, one you should not enter yourself, is:

```
$ sudo ddrescue /dev/sda <
/dev/sdb
```

(Key: < code string continues)

We are using the ddrescue command instead of dd, simply because it does everything 'dd' does, but shows more information about

progress and errors, and is more resilient. You can install this command in Ubuntu by running:

```
sudo apt-get install gddrescue
```

Running this command will copy every byte from the drive found at /dev/sda to the one at /dev/sdb. It makes sense therefore that the second drive should be an identical model to the first, as every byte, even those that are untouched, and not even in a partition, will be copied across to the second, overwriting whatever is currently there. The duplicate will boot just like the first, with every file and operating system intact. An installation of Windows will boot too, though be aware that it can lead to activation problems; there will be no such issues with Linux.

The usual method of backing up in this fashion is per partition. This is where the choice of ddrescue or partimage comes in. Where space is no issue, or the filesystem to back up is almost full, ddrescue is probably the wiser and simpler choice. It is guaranteed to work on any filesystem as a fail-proof backup that can easily and very quickly be restored.

Setting up and mounting a filesystem image

However, one particular advantage of partimage is for freshly installed and configured operating systems. For instance, if you have just installed a copy of Linux with all the updates your partition will probably only be using two to three gigabytes. You can make a clone of the partition with partimage, taking only a couple of gigabytes of disk space on another partition or drive, so that if you later decide to reinstall the operating system, you can go straight back to this fresh installation image. You could even write out the image file onto a blank DVD.

Partimage works with any Linux filesystem and Fat 32. For Windows installations using NTFS, which is almost any since Windows XP, an alternative to partimage, ntfsclone, is required. This is a command-line tool that performs the same job – it creates a special image of only the used data, which can then be restored back. An example of this command is:

```
# ntfsclone --save-image -o <
backup.img /dev/sda1
```

The used data from the NTFS partition /dev/sda1 is saved into the file 'backup.img', in this example into the current directory. Restoring the image is achieved by changing '--save-image' to '--restore-image' and using the '--overwrite' option to supply the destination partition. This option is required because ntfsclone is effectively 'overwriting' an existing file, an existing partition. The ntfsclone utility is part of the 'ntfsprogs' package, which can be installed in Ubuntu in the usual way.

It is important to note that both ntfsclone and partimage write their output images to files, not other partitions. This is because the image format is not a direct copy of the original, just one that can be converted back to that at a later point.

With ddrescue you can copy the data directly onto another partition, although it is usually more sensible to copy it to a file; most of us have lots of spare space available on our filesystem, far fewer will have multiple unused partitions the exact size required for backups.

Loopback

At first sight, one significant benefit of duplicating a partition directly to another partition is that you can easily access the data in the copy. If you would like to copy some files from your backup, rather than restore the full image, it is easy to mount the backup partition and do so. Linux offers a similar feature for backup image files, however, called the loopback device.

When you mount a partition with a command such as 'mount /dev/sda1 /mnt/data', you are telling the operating system to use its drivers to access the data stored in the 'sda1' partition, and lay this out, ready to use, across the filesystem at the directory point /mnt/data. This mounting process is universal across Unix systems. The loopback device lets you mount a regular file instead, so rather than a device external to the filesystem being mounted and therefore included into the filesystem, the loopback device mounts a file that is already part of the filesystem, laying it out elsewhere. The simplest way to do this is with an extra option in the mount command. Here's an example:

```
# mount -o loop  
/tmp/backup.img /stuff/backup
```

The format of the command is almost the same as usual. The loop option tells the system that you are not mounting a device, but a normal file. Hereafter the process is the same as ever. The kernel treats the data in the file 'backup.img' as if it were a normal storage device, meaning you can access, create and change files. This powerful feature therefore allows you to have the same access to an image file as you would if it were a normal mounted partition. If you want to test this out, without using a real backup image, you can create a simple filesystem (see screen 1). In this example, first we are using the dd command as follows:

```
# dd if=/dev/zero  
of=stuff.img bs=1M count=100
```

This copies 100MB from the special device /dev/zero to the file stuff.img, created in the current directory. The

zero device is an infinite supply of zeros, so a 100MB file consisting of zeros is created; this is a standard way to create arbitrary empty files. Next the mke2fs command is run on this file in order to create a filesystem. It warns you that the file you have provided is not a block device. This command now lays out an ext3 filesystem across our blank file, making it an image ready for use. Finally, the new filesystem image is mounted on /stuff using the loopback device. You could now copy files into /stuff, which would in turn be written into the /tmp/stuff.img image file.

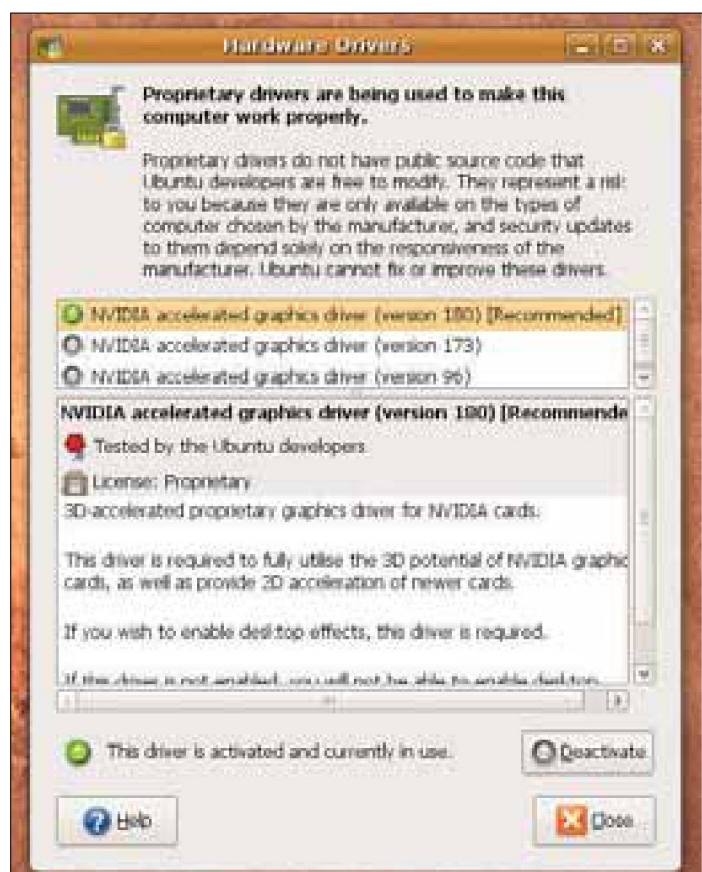
In summary, the dd/ddrescue command is the most flexible of all.

It can back up any partition, even if the operating system doesn't support the filesystem used on it. Image files created by the command can be mounted using the loopback device, or the entire image can be written back in place to restore it to its original state. Partimage and ntfsclone are incredibly useful for backing up filesystems with large amounts of free space, as only used parts of the filesystem are copied. The special formats produced cannot be mounted, or copied directly back, they must instead be restored using the same tool that created them. Both methods have their clear advantages, so use whichever better suits the circumstances you have. PCW

Nvidia driver fix for Ubuntu 8.10 users

There is a problem in Ubuntu 8.10 with the proprietary drivers from Nvidia. Unusual image corruption occurs with window borders when using the 3D desktop effects on certain graphics cards. Nvidia has since released a set of new drivers (the 180 series) which fix this problem, and these are available from Ubuntu 8.10's repositories.

At the time of writing it was not possible to install these through the 'Hardware Drivers' interface (see screen), you should instead manually install them with 'sudo apt-get install nvidia-glx-180'. If you would like to update the drivers, first check the Hardware Drivers interface before manually installing them.



You need to manually install Nvidia's drivers rather than using Hardware Drivers



Ken McMahon is a freelance journalist and graphic designer. His involvement with digital cameras began with a Commodore 64. He graduated to Macs and now works mostly with PCs.

→ Comments welcome on the Digital imaging & video column. Email digitalimaging@pcw.co.uk Please do not send unsolicited file attachments.

Playing with time

How to create impressive video-editing effects such as matting

When I was a kid, at the dawn of the TV era, there were two Australian TV imports that I liked to watch: *Skippy the Bush Kangaroo* and *The Magic Boomerang*.

In *The Magic Boomerang*, a young kid, has a boomerang that stops time when he throws it. The plot always involved some crisis that the lad was able to sort out by stopping time for the 20 seconds or so that the boomerang was in flight. Though everything else stood still, he was able to carry on as normal in the temporarily time-frozen world of the Aussie outback. This was the first time I'd seen time manipulated visually in this way.

More recently the BBC discovered video compositing and there's hardly a news or current affairs programme that doesn't involve a presenter standing in front of a time-accelerated high street. A similar technique, this time slowing down and stopping time, was used to good effect in the last series of *Hustle*, predated by Hiro Nakamura's time-stopping tricks in *Heroes* (see screen 1).

It's easier than it looks to do this and I'll demonstrate two effects – one accelerating time and the other stopping it, both including a person in the scene, for whom time passes normally.

Matting

Both effects rely on a technique called matting. In Adobe Premiere Elements 7, which I'm using here, it's called a track matte, and other applications call it a travel matte. Mattes are used to hide parts of a video track and reveal video in underlying tracks. Mattes can be animated and can be video clips. We'll be using a simple static matte that splits the screen into two areas, one in which the action occurs in real time and the other in which time passes more rapidly, slows down, or stops.



The first effect shows a real-time individual in front of a street scene in which time is accelerated. You'll need the camera on a tripod positioned so your presenter is in front of a static backdrop that extends part way into the scene. By ensuring that what's behind the presenter remains static, compositing the real-time section with the fast-motion street section is much more straightforward.

Next, shoot the presenter's piece to camera as normal. In this example we'll assume the length of the piece is 10 seconds. When you've got what

you need, keep shooting – your presenter doesn't need to be in shot for this bit. How much additional footage you need will depend on the length of the finished piece and

Use the Timestretch tool to speed up the action

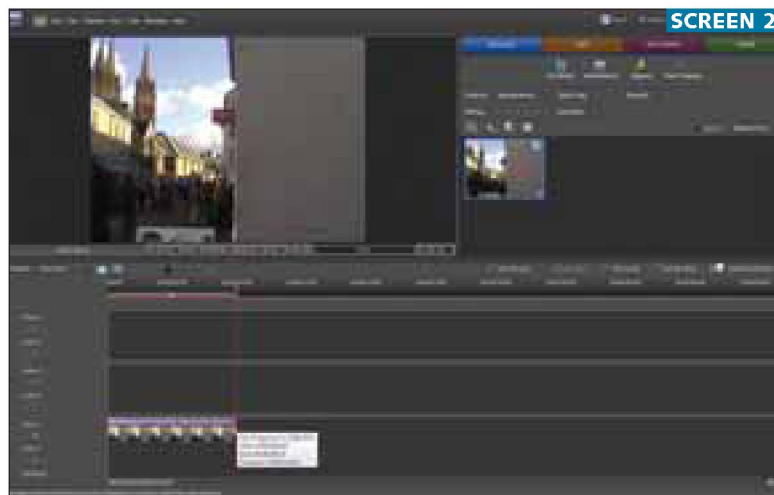
You don't need superpowers to stop time – just a video editor

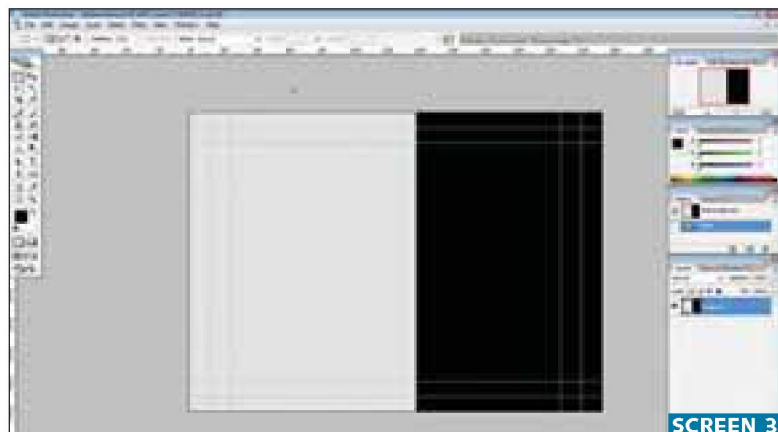
how much you want to speed things up. To get the effect of time passing rapidly – with cars and people zipping around and clouds whizzing overhead, you'll need to accelerate the action by around 10 times or more, so for a 10-second finished piece you'll need 100 seconds, or nearly two minutes of real-time footage.

Capture the footage and divide it into two clips – the 10-second 'to-camera' piece and the two-minute background scene. I'm doing this in Adobe Premiere Elements 7, but most other video editors will handle it in a similar way. The minimum requirements are multiple video tracks, matting ability and speed control.

Stretching time

In Premiere Elements 7, drag the two-minute background clip to the video 1 track. Select the Time Stretch tool above the timeline then select right end of the clip and drag it leftwards until the clip is only 10 seconds long (see screen 2). The 1,000 per cent speed increase is shown in brackets on the clip. You don't want the speeded up audio on this clip, so first uncouple it from the video by





SCREEN 3

right-clicking the clip on the timeline and selecting Unlink Audio and Video from the context menu, then select and delete the audio clip.

By default Premiere Elements 7 creates three empty video tracks in a new project, which is the number you need. Beware if you've deleted and then added new tracks as a bug can cause matting to fail in these circumstances. Drag and drop the 10-second presenter clip into the Video 2 track.

Making the matte

A mask used to hide parts of a clip overlay is called a matte, or in Premiere Elements, a track matte. Mattes in video compositing work like masks in photo editing. They are greyscale images that hide or reveal detail below the masked track depending on the greyscale value of pixels in the mask. Usually, white pixels in the matte display image pixels in the overlay and black pixels mask it, revealing the track below. Grey values in the mask reveal underlying detail in varying degrees of opacity depending on the greyscale value. This is called a Luma matte.

Premiere Elements can also use the alpha transparency in a .psd file as a matte (see screen 3). To create an alpha matte in Photoshop, first create a new document using the appropriate video preset, probably 'Pal D1/DV, 720x576 (with guides)' or the widescreen variant, and set the background contents to transparent. Next, make a selection of the area you want to mask; here it's the right third of the frame occupied by the presenter in front of the wall.

Fill the selection with black (Alt & Delete) and save the file as matte.psd. If you're working in another application, create a file of the correct pixel dimensions (you don't need to

Creating the matte

(click the Get Media button in the Organizer workspace) and drag and drop it at the beginning of the Video 3 track. Drag the right-hand edge of the clip to make it the same duration as the two clips in the tracks below.

Now select the presenter clip in the Video 2 track and click the Edit tab to switch to the Edit workspace. Click the Effects button and select Video Effects and Keying from the two pulldown menus. Then drag and drop the Track Matte Key effect thumbnail onto the clip in the Video 2 Track. Click the Edit Effects button and in the expanded properties area for the Track Matte Key select Video 3 from the Matte pop-up menu and select Matte Alpha from the Composite Using pop-up menu (see screen 4).

You should now be looking at the composited clips in the Monitor. Press Enter to render the work area, then space to play back the timeline, and you'll see the fast-motion effect on the left with time running normally in the superimposed clip on the right.

Slow it down

What about slowing down time, or stopping it? The technique is the same

worry about rectangular pixels as slight distortion will only marginally affect the mask positioning) and save it in a format supported by your video-editing application.

Back in Premiere Elements, import the newly created matte.psd file

except you use the Time Stretch tool to expand a clip and slow it down. To make time stand still you'll need to composite your moving real-time actor over a still frame of the scene.

To export a video frame from Premiere Elements 7, place your background clip in Video 1, drag the current-time indicator on the timeline to the frame you want and click the Freeze Frame button in the Monitor panel. Leave the Freeze Frame duration field at the default five-second setting and click the Export button to save the file to your hard drive and add it to the Organizer.

Delete the background clip from Video 1 and replace it with the single frame clip, dragging the right-hand end to extend it to 10 seconds duration. Now place your live action clip in Video 2, your track matte file in Video 3 and apply the Track Matte filter to the Video 2 clip as before. Now, instead of our presenter standing in a time-accelerated scene, time stands still for everyone but him.

In both examples, I've made things easy by composing the scene so the two time frames occupy the left and right halves of the screen. In the second example, where time stands still, you can make things more interesting by having the real-time actor interact with elements of the frozen scene. This requires a bit of planning and more elaborate matting, but the track matting techniques described here form the basis for all such special effects.

It's an impressive trick that's made easy by digital-imaging software, but if you can't pull it off you could always resort to the same method they used back in the 1960s for *The Magic Boomerang* and get everyone to stand very, very still. **PCW**



SCREEN 4

Applying the track matte in Adobe Premiere Elements 7



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Enriching equations

How to use the EQ field to build equations

If you are of a mathematical bent, Microsoft Office comes with a powerful equation editor – you fire it up by going to Insert, Object, Microsoft Equation 3.0. That version number is unchanged from Office 97 to 2007, and what you get is a toolbar bristling with fly-out palettes of symbols and operators, few of which I can even pretend to understand. There is, however, another way of creating equations and similar constructions should you not have Microsoft Equation 3.0 installed, or if you prefer to work using the keyboard.

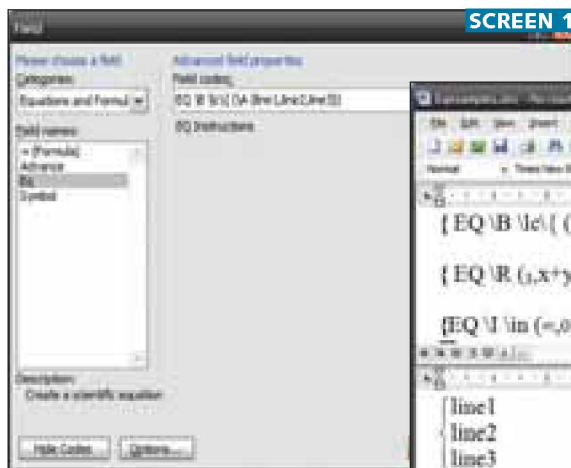
The EQ field lets you build an equation using field codes. Let me say first that I am indebted to Richard Regal, a stalwart of the CIX Word conference, who provided some detailed instructions with some fine examples, and is truly a person outstanding in his field. The CIX discussion started with someone wanting to enclose three lines in a left curly bracket. Now you can use the brackets in the AutoShapes, Basic Shapes section of the Word drawing toolbar, but it's fiddly and the results won't be very satisfactory.

So, Insert, Field, choose Equations and Formulae from the Categories list, and select the EQ field. Do not click the Equation Editor button on the right, instead click the Field Codes button below the list. Add the following switches (it's probably easier to do this manually (see screen 1), than by selecting them from the Options list):

**EQ \B \lc\{ (\A **
(line1,line2,line3,))

(Key: $\backslash$ code string continues)

There is no space between lc and the following backslash. If you've got it right then you should see something like the top-left item in screen – we've split the window as per last month's tip to show codes above and results below.



SCREEN 1

Left: Equations without the editor

So what does it all mean? The first switch \B announces that you want to bracket an expression. Next, the \lc\{ switch means that a left curly bracket will be used, but you can specify any character after \c\{. If you want a closing bracket as well use the \bc\{ switch – it's smart enough to realise the closing bracket should be right-handed. Everything within the outer set of plain parentheses will be included in the curly brackets. The \A switch tells us an array follows, again in parentheses with a comma separating each line.

To take another example, the \R switch starts a root expression. EQ \R (3,x+y) produces the cube root of x+y, but perfectionists will find the 3 too big. You can use another switch, \s, to specify subscript, but it's rather complicated, so I cheated and formatted the actual 3 in the field code as subscript.

At the bottom of the screenshot, I share with you Richard's finest example of nested switches, but forgive me if I don't explain it. Finally, if this gives you a yearning for more, Microsoft provides a load more information here www.tinyurl.com/ajx999.



SCREEN 2

Some equation fields in Word

Ligatures

Despite the best efforts of type designers, certain letter pairs look awkward in print and on the screen. The most obvious example are fi and fl. It's particularly noticeable in serif typefaces – those with cross strokes at the ends of the main strokes, such as Times. Although it's barely noticeable when reading body text, it is obvious at larger sizes. The top of the letter f collides with the top of the l or the dot over the i.

For this reason, traditional typesetting uses ligatures – a pair of specially designed letters combined in one piece of type. More to the point, you can use ligatures in any word processor that supports Unicode. One way is to use the Windows Character Map – this works in any Unicode-compatible application, including Wordpad. Don't worry too much



SCREEN 3

about the font – you can change this later – but it must be a font that contains the ligatures. Not all do, but Times New Roman does and is the default choice when you start the Character Map.

Tick the Advanced View box and make sure that Unicode is selected in the Character Set box, and in the Group By box select Unicode Subrange. This will open a second window with a list of ranges. Choose the last, Private Use Characters, and you should see the fi and fl ligatures. The location seems to vary with the font. Times New Roman has them at F001 and F002 but some other fonts have them at F001 and F002. Choose the ligature you want, click Select, then click Copy (see screen 3). This will put the ligature on the clipboard and you can paste it in to a document. A better way is to type your text normally then use the search and replace feature to look for fi – in the Replace box, paste the copied ligature.

In Word you can use the built-in character map with Insert, Symbol. Make sure Unicode is selected in the 'from:' box, and choose Private Use Area in the 'Subset:' box. A bonus here is that in Word 2003 there's a 'recently used' set, so you don't have to hunt the next time (see screen 4). In Word 2007, you need to click the Symbol button on the Insert ribbon, then 'More Symbols'. In Openoffice Writer, Insert, Special Character summons a similar dialogue to Word's.

Other ligatures exist for other reasons. The ampersand, for example, originates from the Latin 'et', meaning

Copy a ligature to the clipboard

'and'. If you look at the ampersand in Trebuchet or Book Antiqua Italic, you can see this. Some people like to use the combined ae and oe in words such as 'encyclopaedia' or 'oenology'. Personally, I don't find it an improvement, but should you want these, they are in the basic Latin character set – Word will find them if you hold down the Control and Shift keys, press 7 (on the main keyboard) then release all the keys and type a or o. In other applications you can hold down the Alt key and type 0230 or 0156 on the numerical keypad.

Some ligatures used in 18th century printing have fallen into disuse and are not part of the Unicode Character set. The ct combination is a case in point. However, David Manthey has created a replica of an 18th century Caslon typeface, named Wyld, which you can download from www.orbitals.com/programs/wyld.zip. There are upright and italic versions in the zip, and they are free for personal use.

Also included in the zip is a Word macro. This adds two buttons to your toolbar for converting letters to ligatures and vice versa. Click the ligature button and the macro searches your document for text in the Wyld font, and replaces letter combinations such as ct, fi, fl, ffi and so on with the appropriate ligatures, as well as converting the standard letter s, when appropriate, to the long s. It only works with the Wyld font, and the ligatures replace the standard upper-case accented letters (see screen 5). The name, by the way, comes from Samuel Wyld, whose 1725 book, *The Practical Surveyor*, was set in the Caslon font that was David Manthey's inspiration.

If you're not sure whether you have a ligature or separate letters at a point, use the arrow keys to run the

insertion point through the text – it will jump through ligatures as a single character. Be warned, ligatures play havoc with the spelling checker.

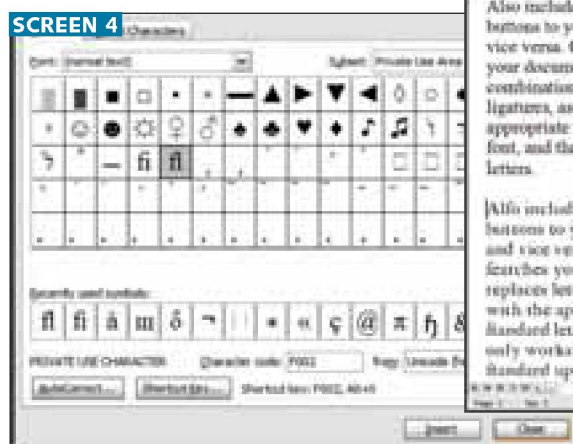
Size does matter

Over in the Windows column in the Christmas and March issues, we mentioned quick ways of resizing pictures to send as email attachments, for example. Vivian Dunn wrote to say that he often created Word documents that contained photos, and consequently ended up with huge files sizes owing to the way in which Word handles images. Then he discovered the Compress Picture button on the Picture Toolbar – it's also on the Picture Tab of the Format Picture dialogue. This, it transpired, did the job well.

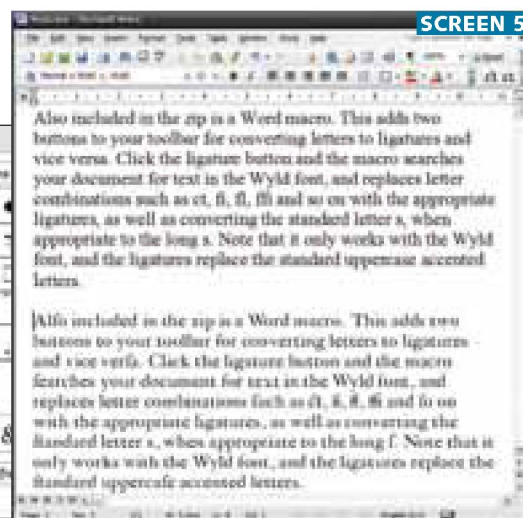
It also works in other Office applications and reduced Vivian's 20MB Powerpoint files to 500KB. "Am I," he asked, "the only person in the world who didn't know about this?" I was aware of the button but had never really tried it out as I tend to resize pictures before importing them into Word. But, having tried it with just one 3MB JPEG file in a document the difference is astounding. Choosing the Print setting at 200dpi reduced the size of the document from 3.04MB to a mere 184KB, with no visible reduction in on-screen quality.

According to the size on the page the picture, which was originally 2,600x1,900 pixels – a total of five million pixels – was now 1,200x900, roughly one million pixels. That's one-fifth of the original size, but the file size of the document was one-seventeenth. That's a rather large rabbit in a rather small hat, and has left me wondering how it's done. PCW

Inserting a ligature in Word



SCREEN 4



SCREEN 5

David Manthey's Wyld font in action



Stephen Wells is a freelance journalist and a regular contributor to computer magazines. He's been writing PCW's Spreadsheets column for over 10 years.

→ Comments welcome on the Spreadsheets column.
Email spreadsheets@pcw.co.uk
Please do not send unsolicited file attachments.

Counting out the cash

Use Excel to ensure your customers aren't short-changed

Readers Dan Cutforth wrote in to say: "I would like a spreadsheet that calculates the most efficient combination of notes and coins to make up an entered cash amount. Ideally the amount would be selected with a spinner, though I'm using Excel 2007 and the old controls on a Forms toolbar don't appear to be available."

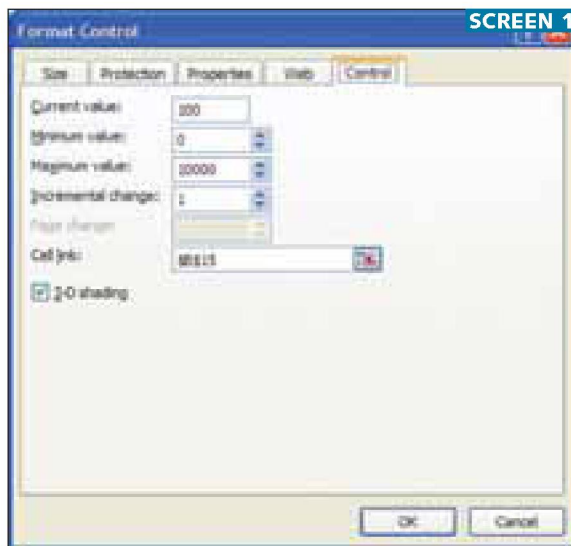
The latest version of Excel doesn't offer such design facilities by default. But they are easy to add. Click the Office icon and then the Excel Options button. Choose Popular and under Top Options you'll find a box you can check next to, Show Developer tab in the Ribbon. Open a new workbook. Click the now visible Developer tab. Click the Insert icon in the Control section. From the now-displayed Form Controls box pick the spinner.

In versions prior to Excel 2007 you just display the Forms toolbar and click on the spinner icon. In all versions, a small cross appears. Draw a rectangle over the cell where you want the spinner to be. Right-click on the spinner and choose Format Control.

In the Format Object dialogue box, under the Control tab, you can enter the starting value, the minimum amount that can be chosen and the maximum amount (see screen 1). The incremental change amount you want is 1, which is the default. Enter the address of any cell that's out of the way to be the link cell. Under the Properties tab of this dialogue box you can choose whether the spinner is to be sized and moved with the cell or not, and if the spinner is to be shown on printouts or not.

Enter the address of the link cell in a cell above or beside the spinner. Divide by 100 so the coins can be calculated in pennies; in other words, if the link cell is B15 enter:

=B15/100



in this cell. Though the formula in the link cell is displayed in screen 2, you could format it using a white font on white background to hide it.

If you'd like to follow the example in screen 2, enter the note and coin denominations in column C starting with cell C3. All you have to do now is enter three variations of a short formula that will calculate how many of each note and coin is needed to make up the selected amount.

If the selected amount appears in cell B1, in cell D3 enter:

=TRUNC(\$B\$1/C3,0)

In cell D4 enter:

=TRUNC(((\$B\$1-SUM

(\$E\$3:E3))/C4,0)

(Key: ↵ code string continues)

Point to the Fill Handle in the lower-right of cell D4 and drag down to cell D13. The second argument of the TRUNC function is a number specifying the precision of the truncation. For calculating the single pennies this argument needs to be increased so in cell D14 enter (see screen 3):

=TRUNC(((\$B\$1-SUM

(\$E\$3:E13))/C14,1)

Establishing the parameters of the spinner

Calculating the minimum notes and coins needed to make a cash amount

To show the total amounts of each denomination enter:

=C3*D3

in cell E3 and drag down to cell E14.

In cell E15 enter:

=SUM(E3:E14)

This total is a check that the amount entered with the spinner agrees with the total of notes and coins selected.

In this worksheet, formatting is unusually important. Cells B1, E3 and E15 are formatted as Currency with two decimal places. Cell B15 is the default General format. Cells E4:E14 are formatted as Number with two decimals, while the ranges C3:C8 and D3:D14 are formatted Number with no decimals. Cells C9:C14 are Custom formatted .00.

Of course there are other formulas that can be used to solve this problem. You could use MROUND and IF statements, but the TRUNC function is the simplest.

Whatever Dan's need for this, there are numerous other uses of the application. For a school shop you could enter the value of a note tendered and the cost of an item, then twiddle the spinner to find the notes and/or coins to be given in change.

SCREEN 2

	A	B	C	D	E
1		£88.88			
2	Scroll amount:	▲	Denominations	Number	Total
3		▼	50	1	£50.00
4			20	1	20.00
5			10	1	10.00
6			5	1	5.00
7			2	1	2.00
8			1	1	1.00
9			.50	1	0.50
10			.20	1	0.20
11			.10	1	0.10
12			.05	1	0.05
13			.02	1	0.02
14			.01	1	0.01
15		£88.88			£88.88

SCREEN 3				
	A	B	C	D
1		=B15/100		
2	Scroll amount:		Denominations	Number
3				Total
4		50	=TRUNC((\$B\$1-SUM(\$E\$3:E3))/C4,0)	=C3*D3
5		20	=TRUNC((\$B\$1-SUM(\$E\$3:E3))/C4,0)	=C4*D4
6		10	=TRUNC((\$B\$1-SUM(\$E\$3:E3))/C5,0)	=C5*D5
7		5	=TRUNC((\$B\$1-SUM(\$E\$3:E3))/C6,0)	=C6*D6
8		2	=TRUNC((\$B\$1-SUM(\$E\$3:E3))/C7,0)	=C7*D7
9		1	=TRUNC((\$B\$1-SUM(\$E\$3:E3))/C8,0)	=C8*D8
10		0.5	=TRUNC((\$B\$1-SUM(\$E\$3:E3))/C9,0)	=C9*D9
11		0.2	=TRUNC((\$B\$1-SUM(\$E\$3:E3))/C10,0)	=C10*D10
12		0.1	=TRUNC((\$B\$1-SUM(\$E\$3:E3))/C11,0)	=C11*D11
13		0.05	=TRUNC((\$B\$1-SUM(\$E\$3:E3))/C12,0)	=C12*D12
14		0.02	=TRUNC((\$B\$1-SUM(\$E\$3:E3))/C13,0)	=C13*D13
15		0.01	=TRUNC((\$B\$1-SUM(\$E\$3:E3))/C14,1)	=C14*D14
16				=SUM(E3:E14)

Sorting the sheets

Every now and then a reader asks how to sort the worksheets alphabetically in an Excel workbook. You can do this with a simple macro. Just press Alt & F11 to open the VBA for Excel Editor. Choose Insert, Module and type the following into the right-hand panel:

```
Sub SortSheets()  
Dim a As Integer, b As Integer, x As Integer  
x = Sheets.Count  
On Error GoTo Trap:  
For a = 1 To x - 1  
For b = a + 1 To x  
If Sheets(b).Name < Sheets(a).Name Then  
Sheets(b).Move Before:=Sheets(a)  
End If  
Next  
Next  
Sheets(1).Select  
Trap:  
End Sub
```

If you're using Excel 2007 you may be asked to save the file with a different extension that allows macros to run. You can use .xlsm instead of .xlsx or plain .xls.

Press Alt & F11 again to return to Excel. Press Alt & F8, click Options in the Macro dialogue box and create a keyboard shortcut, such as Ctrl & Shift & S. Press this shortcut so worksheets and their tab names will be sorted.

For many years, other spreadsheets such as Lotus 1-2-3 and Quattro Pro have enabled their users to colour the tabs that show worksheet names. Finally, with Excel 2002 Microsoft relented and allowed users to do it too. You just right-click on a tab, choose Tab Color and pick a colour from the offered palette.

Since this availability, readers have asked if it's possible to group worksheets by tab colour; in other words, put all the red-tabbed worksheets adjacent to each

The formulas used to create screen 2

other, all the blues, and so on. This is indeed possible with the following macro (see screen 4):

```
Sub GroupColours()  
Dim CT1 As Long  
Dim CT2 As Long  
For CT1 = 1 To Worksheets.Count - 1  
For CT2 = CT1 To Worksheets.Count  
If Worksheets(CT2).Tab.ColorIndex = Worksheets(CT1).Tab.ColorIndex Then  
Worksheets(CT2).Move after:=Worksheets(CT1)  
End If  
Next CT2  
Next CT1  
End Sub
```

Taking stock

In these times of financial uncertainty, wise shareholders will always obtain a copy of a company's annual report each year and take advantage of a spreadsheet's facility for analysis.

Interest cover is an important measure of the financial health of a company. It measures the company's ability to cover the interest payments owed, and margin of cover if profits should fall in a recession. It is calculated by dividing the operating income by net

Helpful shortcuts

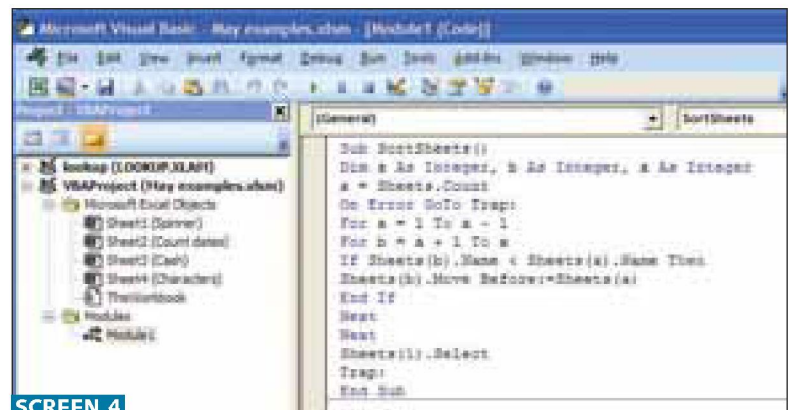
After you make an entry in Excel, the cursor moves to the next cell. If you want it to stay in the same cell in Excel 2007 you could click the Office icon, Excel Options, Advanced, Editing options, and remove the check from the 'After pressing Enter, move selection' option. Alternatively, you could simply use the shortcut Ctrl & Enter.

Traditionally, you could always get an overview of your computer system, the processor speed, amount of Ram and so on, via an option on the Excel Help menu. There is no similar Help menu in Excel 2007, but you can instantly show the System Properties dialogue box with its comprehensive analysis of your computer using the Windows key & Pause/Break combination.

interest. The interest cover should always be more than two times, or the company can be in trouble. Net interest is the interest payable on loans less any interest received. But watch out for any capitalised interest; this may be a perfectly legal procedure but the interest still has to be paid.

Another important ratio is debt to equity. This is calculated by dividing the total liabilities of the company by the stockholders' equity. The higher the ratio, the more the company may be extending its debt beyond its ability to repay. Even if interest rates stay level, if this ratio increases from year to year then the annual charges will add to the company's overhead.

In future I'll look at other financial ratios of interest to the careful investor. In spreadsheets veritas. PCW



A short macro for sorting worksheet tabs alphabetically

SCREEN 4

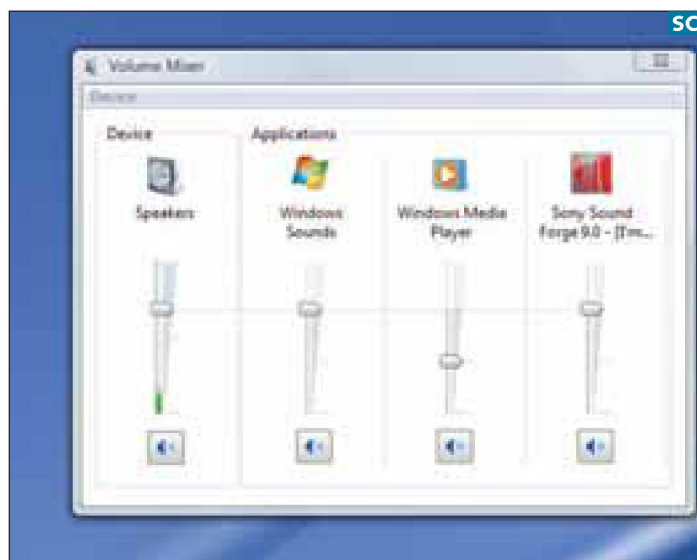


Niall Magennis has been dabbling in Midi and digital audio since the days of the Atari ST. He writes for a number of music magazines and lives in London in a flat overrun with music equipment.

→ Comments welcome on the Sound column. It returns in the July issue. Email sound@pcw.co.uk
Please do not send unsolicited file attachments.

Get better sound with Vista

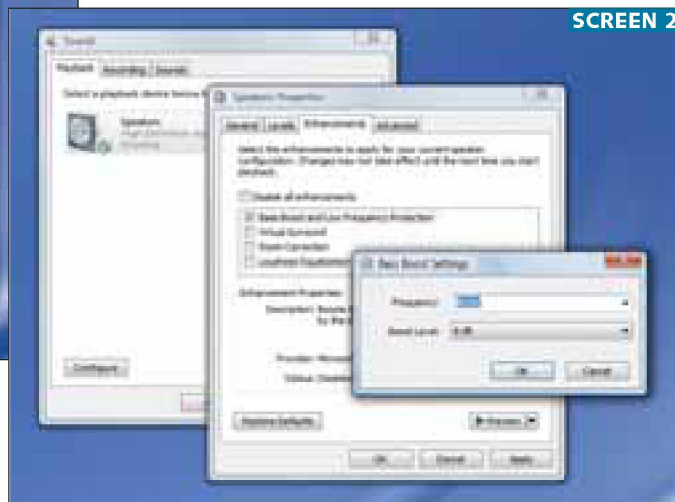
Take a tour round the inner workings of Windows Vista's audio controls



SCREEN 1

Left: Unlike in previous versions of Windows, Vista lets you control the individual volume level of applications

Below: You can compensate somewhat for a lack of a subwoofer with the Bass Boost function



SCREEN 2

When it first launched, many people complained that audio support under

Windows Vista was worse than under XP; audio glitches were common, especially when switching between applications or moving open windows around the desktop, and Vista even struggled to play an MP3 file.

The source of the audio woes was the total redesign of the way Vista handled audio. Microsoft had been dismayed by the number of crashes caused on its previous operating systems due to problems with audio drivers. It took the issue so seriously that by default it turned off the audio stack in Windows Server 2003.

Its plan for Vista was to avoid these issues by removing much of the audio functionality from the operating system's kernel. The advantage of this is that if the audio system collapses it doesn't drag the whole OS down with it. The disadvantage was that existing drivers needed to be rejigged to work.

The new audio system is quite complex because it involves a new

driver format called WaveRT (see box), three new APIs, plus the use of Vista's Multimedia Class Scheduler Service (MMCSS). The MMCSS allows applications to request high-priority processing from the CPU when working on time-sensitive processes such as playing audio – audio data needs to arrive in sequence and on time to the soundcard to avoid gaps and glitches in playback.

It didn't help that the WaveRT driver specification underwent significant revisions just before the final version of Vista was released. This late change meant some early drivers were written to the older specification rather than the newer version; it's this that caused some of the glitches.

SP1 tweaks

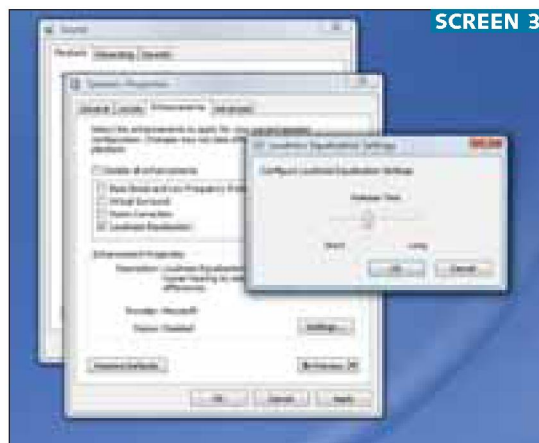
Microsoft made some tweaks to the audio system with the release of Service Pack 1 for Vista and this, combined with newer drivers from manufacturers, seems to have cured many of the audio problems. If you're still experiencing problems, our advice

is to first make sure you've installed Service Pack 1 and all the other latest operating system updates, and second to make sure you've upgraded your soundcard's or soundchip's drivers to the latest version available.

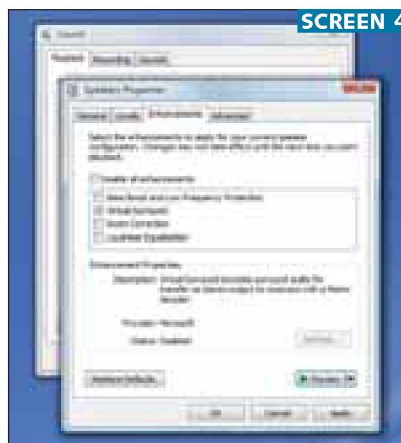
You should be able to find the latest drivers for your card by visiting the support section of either your card or computer manufacturer's website.

While these audio problems are annoying, they are to be expected when a new audio architecture is introduced. Apple had similar, if less extreme problems, when it moved to its Core Audio system with the switch to OSX and many of us can remember similar driver issues with the move from Windows 98 to XP.

The new audio technologies added to Vista haven't all been a disaster. As well as the update of the underlying audio system, Microsoft has made some useful tweaks to how the



SCREEN 3



SCREEN 4

volume control panel works and added some neat audio tools and effects. But while these updates have been far more successful, many people either don't know they exist or don't understand how to use them. So let's take a look at them in more detail.

One of the most basic, but useful features is the mixer control panel. In previous versions of Windows the mixer panel only allowed you to control hardware volume – the level of your soundcard's audio output or the level of the output from your soundcard's onboard synthesiser. In Vista, Microsoft has changed this to allow you to control individual audio streams from different applications. For example, when you're listening to music in Windows Media Player you can turn down or mute the volume of the email alert in Outlook so you don't hear a 'ping' if an email turns up midway through a music track.

To access the application mixer click on the speaker icon in the taskbar and then click on the mixer link at the bottom of the Device volume slider. This will open a new mixer panel with faders to control the individual volume levels of each open application. The main volume control now includes an integrated volume meter that rises and falls in green along the length of the device mixer panel. This can act as an aid in troubleshooting audio problems; if you can see the meter moving up and down then Windows is producing audio, the fault must lie with some other elements of your audio system.

Hidden gems

Some of the more interesting audio tweaks are a bit more elusive because they're not supported by all sound chips and soundcards. Whether you can access them or not will depend on the driver that your soundcard manufacturer provides. Most built-in audio solutions support many of these

Above left:
Loudness
Equalization aims
to stop you having
to constantly adjust
volume levels

Above right: Virtual
surround takes your
stereo music tracks
and upmixes them
to surround sound

tweaks, but as far as we can tell many drivers for dedicated cards, such as those from Creative, don't. To check whether you can use them click on the Start Menu, select Control Panel and then click Hardware and Sound. Next click on the Sound link and in the window that appears select the Speakers icon under the Playback tab and then click on Properties. If your soundcard supports the new features you'll see a tab called Enhancements. The new features include Bass Boost, Virtual Surround, Loudness Equalization and Room Correction.

Bass Boost is designed to be used with speakers that lack a subwoofer. It boosts the lowest frequencies that can be played by your speakers and removes low frequencies below that level. Settings to control the cut-off point and the boost level are included.

Loudness Equalization is a volume levelling control to equalise the overall volume of your computer's audio output, so you don't have to constantly turn the volume up and down to adjust for differences in the level between

music tracks or for adverts when you're watching TV on your computer. Virtual Surround takes a stereo audio feed, say from a music track, and converts it to multichannel audio for output on a surround-sound system.

Room correction is by far the most interesting of all the new enhancements since it's a feature that has only previously been available on really high-end surround-sound audio systems. Essentially it can tweak the audio being sent to your surround-sound speakers to not only adjust for the position of the listener, but also to compensate for the acoustics of the room.

To use it, all you have to do is hook up a microphone to your PC and then place it where you usually sit when you listen to your surround-sound speakers. You then run the Room Correction wizard, which will play some sound through your speakers while listening to the results via the microphone. It individually tweaks the output of each speaker for volume, delay and frequency response to give you the best possible listening experience; you will, however, need a good-quality microphone to get good frequency response readings. The value of this really shouldn't be underestimated – some people have spent thousands of pounds on hi-fi systems that don't have the same level of functionality as Vista's Room Correction feature.

Vista still has its problems with audio, but at least Microsoft finally seems to be getting on top of these issues while at the same time coming up with some innovative new features for us to play with. **PCW**

How WaveRT can help with time-critical tasks

Many people seem confused by the WaveRT driver format, especially as not all soundcards seem to support it or need to support it. WaveRT is part of the audio system overhaul Microsoft has carried out on Vista and is a new port driver format that was designed to offer low latency performance (ie low delay) for time-sensitive audio tasks such as recording and playback in audio sequencers. It works in conjunction with the three new audio APIs, as well as the new Multimedia Class Scheduler Service, which allows multimedia applications to ask for priority service from the system's CPU when they're running time-critical tasks.

WaveRT can be seen as the new 'native' audio driver format for Vista. However, to work

under Vista an audio card doesn't have to use a WaveRT driver. In fact, most currently don't. Instead they can use an MME or WMD driver. The difference is that under Vista, the APIs these drivers use are re-routed to use the three new audio APIs, so essentially the drivers are working in an emulated mode.

It's also worth noting that WaveRT is designed solely for use with PCI and PCI Express audio cards and chips (onboard chips interface with the system via the PCI/PCI Express bus). This means that all USB and Firewire sound devices that don't come with WaveRT drivers at the moment look like they never will. That said, you never know what the final version of Windows 7 might bring.



Alan Stevens has implemented and supported networks for over 25 years, working for IT vendors, system integrators and customers. He now mostly researches and writes about networking matters.

→ Comments welcome on the Networks column.

Email networks@pcw.co.uk

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Switching routers

Ditching the free router supplied by your ISP can create problems

I've a number of tales of woe to regale you with this month, starting with the troubles I had when I tried to change my wireless broadband router.

Like the majority of home and small-business users, I rely on a free router supplied by my ISP. In my case it's a Thomson TG785 from O2, which I use to connect both wired and Wifi networks to the internet. Most of the time it works fine but, of late, it's started to play up, at times dropping the internet connection or refusing to talk to anything connected to its wired ports. It's the latter that I find most frustrating as I mostly use wired connections and can't access the router to find out what's wrong when this happens.

On the plus side, turning it off and back on again usually puts things right, but it takes time and, having restarted it for the umpteenth time the other day, I decided to take action – to replace the freebie router with something a bit more upmarket and, hopefully, reliable, in the form of a Draytek Vigor 2820.

However, changing from the router supplied by my ISP to a Draytek Vigor was far from straightforward.

Only the start of it

It should have been easy as I'd reviewed the Vigor before and had been meaning to switch to it permanently for some time as it has a lot more to offer than the Thomson hardware. To begin with it has two Wan interfaces, one of which can be 3G, that can be used for both failover and load-balancing purposes. It also has a built-in virtual private network (VPN) server, a much better firewall and a lot more in the way of management options than the O2 router (see box opposite).

In practice, however, swapping routers was far from simple, taking the



best part of the day and, even then, failing to provide the results I'd hoped for. Not through any fault of the router involved, but because of other issues.

The first problem was getting the Vigor to connect to my ISP. In theory I should have been able to just plug it in and switch it on, the modem automatically detecting the ADSL-2+ settings required. That, though, didn't happen and, in my experience, rarely does. Moreover, the settings I'd jotted down last time I used it must have been for a different service, as they didn't work either.

I did find some information about setting up third-party routers on the O2 broadband website, but it was all pretty general and I spent a long time

The Draytek Vigor 2820 router has two Wan interfaces

It took a lot of experimenting to find the right settings to enable the Vigor router to connect with my ISP

trying different permutations before I eventually worked out the appropriate protocols to use (see screen 1).

Then I discovered new firmware had been released for the router, one of the advantages of which was better stability with the latest ADSL2+ services. I decided it would be wise to upgrade so downloaded said firmware, installed the update utility and attempted to squirt it over to the router.

Another hour or so later, I was no further forward. The firmware would start to copy across, get about three-quarters of the way and then stop. Disabling the desktop firewall helped, but in the end I had to get hold of an earlier update program and use that.

From then on it was plain sailing. The internet connection held, I quickly changed the router settings to match what I normally use and configured my Wifi devices to use WPA2. Fantastic, I thought. Then my wife came home and tried to connect to my wireless network using the laptop supplied by her employer. It wouldn't work and, to cut a very long story short, the Wifi adapter in her notebook stubbornly refused to connect unless I downgraded from WPA2 to plain WPA-only security and told the Draytek router to only use channel 6. At which point, I started having problems connecting with my Linux-powered notebook and had to spend yet more time trying different combinations to see if I could find settings to work with both.

Nothing worked satisfactorily and I was further hampered by the fact that I couldn't change much on my wife's laptop as the software needed to manage the Wifi interface wasn't there. So, come the end of the day I had to admit defeat and revert to the freebie Thomson router, which at least worked with everything even if it wasn't quite as good as I wanted.



And the moral of the tale? Well a couple of things. First, if you're going to swap routers you need to know in detail how it should be configured for the ISP you've signed up with, and that's not always easy. Second, you shouldn't take compatibility for granted no matter what vendors might say, especially when it comes to wireless networks. Just because a router says it supports a particular type of security, there's no guarantee it will work with other implementations. It should, but sometimes it won't.

I've since told my wife to get her company to buy a new laptop with all the software needed to manage its Wifi interface and draft-N wireless – another potential can of worms and an option I didn't even dare to enable on the Vigor router. Hopefully, that'll happen soon, and I'll be able to upgrade my router the way I planned.

More Ubuntu SMB woes

So much for my router problems. I decided a while ago to abandon the Vista pre-install on my Dell Vostro 1310 in favour of Ubuntu, the latest release of which (8.10) is a very competent and well-rounded distro, offering just about everything I need on a day-to-day basis.

The latest Ubuntu 8.10 release was therefore downloaded and installed onto the Vostro with no trouble at all, right down to configuring the touchpad, selecting the best possible screen resolution and, crucially, correctly identifying the built-in Wifi adapter and connecting it straight away to my wireless router. I could even put the notebook into hibernation, wake it up and reconnect to the Wifi network with no trouble at all.

It was going fine until, a week or so later, I downloaded and installed the latest patches, as prompted by the update utility included as part of the distro. From then on I could no longer connect to any Windows SMB shares on my network. Everything else worked fine, and I could still connect to the shares from another Ubuntu system that hadn't been updated. The notebook, however, refused to even display a list of Windows servers in its Nautilus browser. Instead it would hang about doing little before, eventually, telling me it had failed to mount the shares involved.

Naturally I started looking around on the web to see if I could find other users with the same problem and, hopefully, how to fix it. I found lots;

How to tailor your O2 wireless router

I'm used to being able to explore and tailor the configuration of a router via its web interface, but most of the options on the O2 wireless router are locked and can't be changed, even when you log on as Administrator. There is, however, a way of getting more access and, as one of the worst kept secrets on the web, I'm not giving anything away by telling you how.

What you have to do is log on using the name SuperUser and a password of O2Br0ad64nd, paying attention to capitalisation as shown.

You can only log on this way from the Lan, not over the internet, and you don't get a huge amount of extra functionality. You will, however, be able to configure address-based filters, change the level of firewall security (not by much), create new user accounts and

view the security logs. Note that the O2Care account shown in the screenshot is reserved for O2 support staff needing remote access to the router.



Log on to the O2 router as SuperUser to access previously hidden settings

some with the same symptoms, and variations on the theme. I also found a number of fixes, all of which I tried but with no success.

Unfortunately this is the second time I've been affected by SMB troubles in Ubuntu. I wrote about a similar problem in the 8.04 LTS distro in September 2008 and thought it would not only have been resolved by now, but that any new release would be free of such problems. Instead it seems to have found its way into the updated version too.

For many of us SMB file sharing is a fundamental prerequisite, this bug making my Vostro notebook more or less unusable. I spent about half a day trying to fix it but just as with my router I eventually gave up trying.

I could, of course, have changed to another Linux distro, but instead have junked Linux on my notebook for the

time being in favour of the Windows 7 beta. This has no problems with SMB shares, at least not so far.

Email on storage

Finally, as a postscript to my articles on home email servers, I've long wondered why vendors of network attached storage (Nas) appliances don't build one into their firmware. Many now routinely offer built-in web, media streaming and other tools on top of the basic file and printer sharing, and a mail server would seem a logical next step.

Well, Synology has now taken that step with the beta release of its Disk Station Manager software which features an SMTP/Pop3/Imap4 server, called Mail Station. Available to run on a range of Synology appliances, I've yet to download and try it, but it's on my to-do list and, of course, I'll let you know what it's like when I do. **PCW**



Synology has added an email server to the firmware that powers some of its Nas appliances



Mark Whitehorn is one of those lost souls who actually likes databases. He splits his time between consultancy, writing, working for two universities and tinkering with old cars.

→ Comments welcome on the Databases column.

Email database@pcw.co.uk

Please do not send unsolicited file attachments.

Primary relationships

Discover what compound primary keys can do for you and your data

A primary key provides a value that is guaranteed to be unique for every record in a table. This is often a number in a single field. For example, if we sell books, we could give each book a unique ProductID, as in screen 1.

It is a good idea to use a simple primary key like this because it's easy to understand and queries will be fast. Access' AutoNumber data type is often a good choice. However, it is possible to use two (or even more) fields for the primary key; this is called a 'compound' or 'joint' primary key. If you do this, it is fine for two records to have the same value in one of the fields as long as the other contains a different value. For example, in screen 2 the table's primary key is made up of ProductID and ProductID2. We can now have duplicate values ProductID as long as the value in ProductID2 is different (and vice versa). As the screen shows, if we tell Access these two form the primary key, it will ensure we never duplicate the values in both fields between two rows.

So, a good question, and one that PCW reader Tom Boyd asked, is: under what circumstances is it worth accepting the added complexity of a compound primary key?

One answer is that the table above is a good example of bad practice. All I have done is to make the table more complex for no gain. However, when used correctly, compound primary keys are wonderful. More than that, they are common because we use them to solve a common problem.

Databases are constructed to model the behaviour of the real world. In that world, we find real-world objects that have a many-to-many relationship between them. Imagine a situation where we have many products for sale and many orders being placed by our customers. Each

SCREEN 1

ProductID	Product
1	Gordon the Wonder Land Rover
2	Big Blue looks after you
3	EF goes to France

Here's a sensible primary key

product can appear on many different orders and each order can have many different products on it.

Our database needs to be able to store this relationship, so we need a many-to-many relationship between the Order table and the Product table. We do this by creating a table that sits between Order and Product – I've called it OrderDetail (see screen 3).

Following the joins, we can see that Order number 1 was for two different products: three copies of 'Gordon the Wonder Land Rover' and two copies of 'EF goes to France'. Order number 2 was for three products.

Suppose the customer who placed order number 1 rings back and adds four more copies of 'Gordon the Wonder Land Rover', we simply amend the Number field from 3 to 7. We actively don't want more than one row in OrderDetails that points to the

same order and the same product; it would just be confusing. If we declare these two fields to be the primary key of OrderDetail, Access ensures that we can never do this.

There is an important point here. When people (myself included) first use a relational database, they often find that it seems obstructive. No matter what you try to do, the database engine interferes. You can't change this, you mustn't do that. But, if the database is designed properly, it never gets in the way unless you try to do something foolish (such as adding the same product to an order twice).

Unnatural primary keys

Tom also mentioned my brief coverage of natural primary keys, which use a value that already exists in the real world and is guaranteed to be unique, such as the registration number of a

A less sensible, compound, primary key

SCREEN 2

ProductID	ProductID2	Product
1	1	1 Gordon the Wonder Land Rover
1	2	2 Big Blue looks after you
2	1	3 EF goes to France
2	2	3 EF comes back from France
2	3	3 EF goes to Russia



A highly sensible and useful compound primary key

car. Even if you find a natural key, it's always worth considering whether it is the best solution; just because there is a natural key doesn't mean it's definitely the best in every situation. For instance, where you have a table of employees, each one with a National Insurance number, it's tempting to use the NI number as the primary key. However, NI numbers contain a mix of characters and numbers and will make queries slower. This is unlikely to be a problem in a small business, but it could become so with a very large table. You may also have to cope with rare instances where employees don't have a number. Store NI numbers by all means, but consider using a more compact numerical value/AutoNumber as the primary key.

Not just a database problem

Oliver Metherell leads Super7 (www.super-7.co.uk), an attempt to make a first ascent on every one of the seven continents (we are talking mountain climbing here). The current status is five done, two to go. Oliver presently maintains a mailing list in Word and feels now is the time to move up. Excel and Access could both be excellent candidates, depending on your data, expertise and circumstances. I'll demonstrate the Access path.

Oliver's email list is stored in Word like this:

```
Foo <foo@baa.co.uk>; ␣
foo <footoo@baatoo.com>;
```

(Key: ␣ code string continues)

The first issue is that multiple addresses can be held in a single line in the Word document and we'll need to standardise on one per line. This problem is most easily solved in Word using the Replace utility.

Set up the Replace utility with a semi-colon followed by a space in the 'Find what' box and type ^p into the 'Replace with' box. This will find the

semi-colon in the middle of a line and the ^p will replace it (and the space that follows it) with a paragraph break. This ensures all email addresses are on different lines. Then run Replace again, but this time searching for just a semi-colon and leaving the 'Replace with' box blank. This removes the semi-colons at the ends of lines. The result is:

```
Foo <foo@baa.co.uk>
foo <footoo@baatoo.com>
```

Now we need two passes through the data with the Replace utility to find and remove (by leaving the 'Replace with' section blank) the < and > characters. The result is:

```
Foo foo@baa.co.uk
foo footoo@baatoo.com
```

Now for the data transfer. In Access prepare a table to hold the data. In the sample database DBCMAY09.mdb, which you'll find on this month's cover disc, the table Mail has two columns: one is an AutoNumber primary key field and the other is called EmailAd. Highlight the list in Word (Ctrl & A), copy (Ctrl & C), then swap to Access. In the datasheet view of the Mail table, click in the EmailAd column header and then paste (Ctrl & V).

Now we can use Access' data manipulation capabilities to finish the task by removing the names. The key to solving this problem is that there is always a space character between the bit we don't want (the name) and the

bit we do want (the email address). All we have to do is to find that space character and then take all the characters from that point to the end.

Make a copy of the table and we'll start work on it. Base a query on the Mail table and add the EmailAd field. We find the position (counting from the left) of the space character using a function called InStr (short for InString). In a fresh column, build an expression called PosSpace:

```
PosSpace: InStr(1,␣
[EmailAd], " ")
```

InStr needs to know from where you want it to start counting, the column to be searched and the character you seek. We'll start at the beginning of the string with character 1, though you can omit this argument as the function's default behaviour is to start at 1. This is the SQL:

```
SELECT Mail.EmailAd, ␣
InStr(1,[EmailAd], " ") ␣
AS PosSpace
FROM Mail;
```

Now we know where the spaces are. There is another function called Mid that will chop up a string. You tell it the start position and how many characters you want to chop out. Now, as a first guess we might try:

```
CleanEmail: Mid([EmailAd],␣
[PosSpace],100)
```

This says: take the string which is in EmailAd (Foo foo@baa.co.uk), go along to the position shown in PosSpace (which happens to be 4) and then chop out the string from there to the end; technically, it chops out from there to position 100, but Oliver had no strings longer than 100 characters.

This works but it includes the space from which we are counting, so:

```
CleanEmail: Mid([EmailAd],␣
[PosSpace]+1,100)
```

works better.

It is left as an exercise for the reader to work out how we could isolate the name and put it in another field – hint: a function called Left is very handy here (see screen 4). PCW

Use an Access query to clean up names and email addresses

SCREEN 4

EmailAd	PosSpace	CleanEmail	Name
Foo foo@baa.co.uk	4	foo@baa.co.uk	Foo
foo footoo@baatoo.com	4	footoo@baatoo.com	foo
jimmy jimfoo@baa.co.uk	6	jimfoo@baa.co.uk	Jimmy
JK jimk@baatoo.com	3	jimk@baatoo.com	JK
ABM abm@baa.co.uk	4	abm@baa.co.uk	ABM
ABM annabelle@baatoo.co	4	annabelle@baatoo.com	ABM



Tim Anderson is an IT journalist and software developer, and began writing for PCW in 1993. Since his first Commodore Pet, he has acquired expertise in Rad programming, Windows and the Internet.

→ Comments welcome on the Visual programming column.
Email visual@pcw.co.uk
Please do not send unsolicited file attachments.

Debug for free

Three ways to edit and debug your Javascript code

Javascript is one language you cannot avoid if you go anywhere near web development or cloud computing. Even when coding in PHP, ASP.Net or Java, Javascript is necessary for smooth client-side performance. You can take advantage of the numerous Javascript libraries out there, such as JQuery, Dojo, Mootools, Prototype or Scriptaculous.

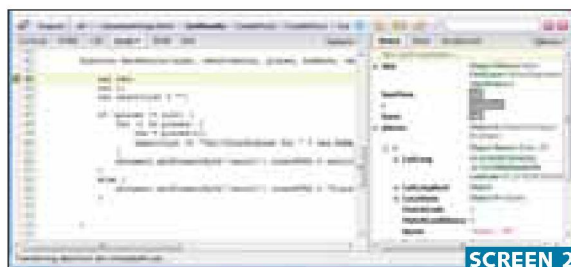
There are also several Javascript APIs (application programming interfaces) for web services, including mapping APIs such as Google Maps, Facebook's Javascript Client Library, or any Rest (URL-based) API, particularly those that return data in JSON (Javascript object notation).

So, what is the best tool for editing and debugging Javascript? The Javascript you write may be executed by any number of different runtime engines in various versions. According to the latest figures from Hitslink, that means 68 per cent Internet Explorer, 21 per cent Firefox, eight per cent Safari, one per cent Google Chrome, and so on. It gets worse if you drill into browser versions. The next most popular browser after IE 7 is IE 6. Write once, test everywhere seems to be the order of the day. That said, Javascript is a well-known ECMA standard and cross-browser compatibility of the core language is good. The bigger issue is over the browser's Document Object Model (DOM) or Cascading Style Sheets (CSS) implementations, which vary greatly. Javascript libraries wrap these as far as they can, but you will still encounter them in your own code.

Javascript debugging used to be a matter of sprinkling alert statements through your code or printing to a debug window. That is no longer the case. What follows is a look at some popular options for Javascript development and debugging.



SCREEN 1



SCREEN 2

Debugging with Firebug

Open the page you want to debug and select Firebug from the View menu. Firebug slows web browsing, so by default it is mostly disabled. Check the panels for Console, Script and Net, and Firebug bursts into life (see screen 1).

The Console tab is a command line into the active web page. For example, if you type

```
document.body.innerHTML+=  
"<b>Hello world</b>";
```

(Key: ↵ code string continues)

your web page will be replaced. You can also write to the console in your Javascript with commands such as:
`console.log("some value")`

Another handy command is `dir()`, which inspects an object and outputs its values. You can type these at the console or include them in your code.

Top: Use Firebug's panel to enable debugging for a site or server

Bottom: Debugging a script in Firebug

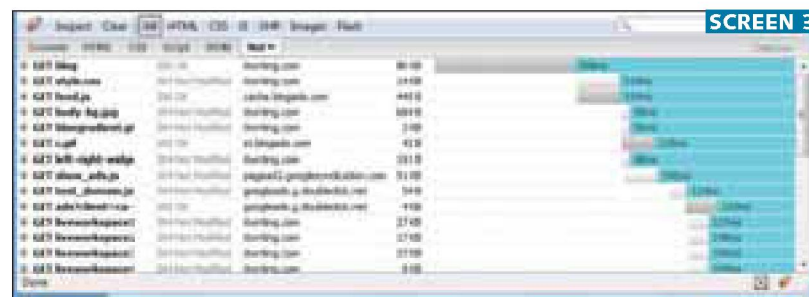
The HTML tab shows the source code for the current page. If you click Inspect in the top Firebug bar and hover the mouse over an element in the page, the code for it is highlighted in the HTML view. The CSS tab shows the styles defined for the page.

The Script tab is where you can get deep into debugging (see screen 2). Set a breakpoint by clicking in the left margin so a red dot appears. Run the code, and it will pause at your breakpoint. Now you can inspect variables, step over, into or out of the code, and view the stack trace. This insight is invaluable. Say, for example, you are coding against Microsoft's Virtual Earth API. One argument to the `findPlace` method is a function that is called back with the results. Two of the arguments to the callback function are arrays of results, and the documentation is not all that clear on how they differ. The breakpoint lets you inspect the arrays in detail.

The Net tab in Firebug shows you each separate HTTP request that forms the current page, with headers, timings and other details (see screen 3).

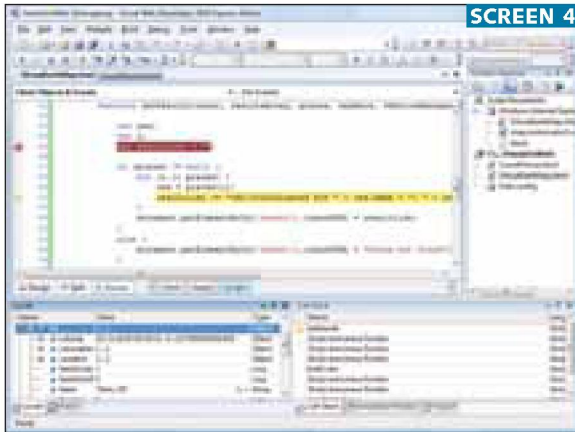
Debugging with Visual Studio

Firebug is only a debugger. You can edit pages on the fly, but it is not an IDE (integrated development environment) and those edits are lost once you close the page. A more integrated alternative is Microsoft's Visual Web Developer (see screen 4),



SCREEN 3

Firebug's Net tab shows timings for each HTTP request



SCREEN 4

even for projects that do not use ASP.NET. For this the free Visual Web Developer Express edition is fine.

Run Visual Web Developer and start a new website. Choose the Empty Web Site template, add a new HTML page and code your Javascript. Click Run or press F5 to start debugging.

At this point Visual Studio will prompt you to create a web.config file to enable debugging. Let it do so. It may also display a dialogue stating that debugging is disabled in Internet Explorer. You have to run IE, select Tools, Internet Options, Advanced, and uncheck Disable Script Debugging. Then exit IE and try debugging again.

There are several strong features. Visual Studio has its own internal web server, which is a secure and simple way of debugging .Net or static websites. Set a breakpoint in your code and try the application. The debugger is in Visual Studio, not IE, and you get full features including variable inspection, watches, call stack and an immediate window where you can type Javascript code and access the DOM. Visual Studio also supports the debugger statement, which works like a breakpoint. Press F11 to step into code, or F10 to step over. It is not quite as feature-rich as Firebug; there is no way to write to the output window and no timings to profile your code. That said, Visual Studio is a decent HTML-authoring environment, from a developer as opposed to a designer perspective, and has a CSS editor and an HTML document outline that speeds code navigation.

The Visual Studio editor has error detection and code completion for built-in types. It formats your code subject to the rules in Formatting and Validation, available from a right-click menu in the editor. It is highly customisable, right down to settings for individual tags (see screen 5).

Debugging Javascript with Visual Web Developer

There are problems with Visual Studio for Javascript debugging. One is that you are debugging IE and while you can preview your application in other browsers, you lose the debugging integration. Since IE is quirkiest than other browsers, this makes it hard to use for all your debugging.

There is an annoyance: browsing the web with IE's debugging enabled can result in continual error dialogues. IE8 is better in this respect, because Visual Studio can enable and disable debugging on the fly, so you can still browse with debugging disabled.

Debugging with Aptana

Aptana is a commercial, open-source IDE built on Eclipse. There is a free edition for Windows, Mac or Linux. Since Aptana is somewhat intrusive, inserting its own top-level menu, the standalone option is attractive.

Aptana is a specialist Javascript IDE, with some unique features. One advantage is that you can specify commonly used Javascript libraries when starting a new project. These are inserted into a lib folder in your project directory. For example, here is how to create a simple Scriptaculous slide effect. Start a new Aptana project, and check the option for Scriptaculous. Modify the generated index.html, first inserting a reference to the Scriptaculous and Prototype libraries within the <head> element:

Next, write some text within a <div> element that will be the subject of the slide effect:

```
<div id="slider"><p>This text will appear and disappear with a slide effect.</p></div>
```

Add a <script> element with a function to apply the effect:

```
<script type="text/javascript">function slideit(show){if (show) {Effect.SlideDown('slider');} else {Effect.SlideUp('slider');}}</script>
```

Finally, add some controls to apply the effect:

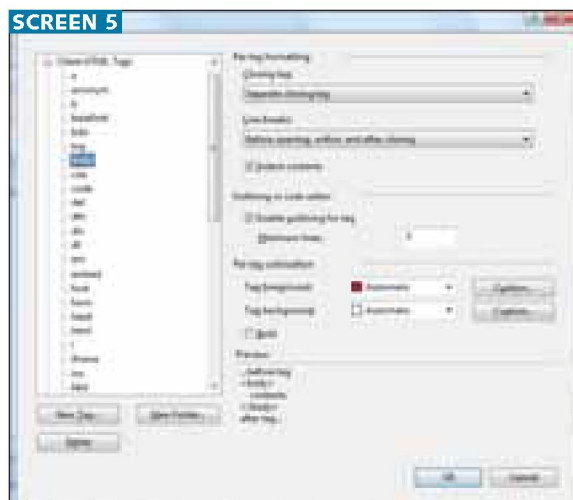
```
<button onclick="slideit(true);">Show with a slide</button><button onclick="slideit(false);">Hide with a slide</button>
```

You can test this by clicking the preview tab for Firefox or IE. You can also set breakpoints and debug the code. Click the Debug perspective icon or select Windows, Open Perspective, Other and then Debug. In the source window, click in the left margin by the line where you want the breakpoint. Next, click the Debug icon in the toolbar, or select Debug, Firefox Internal Server. Exercise the code and Aptana activates the debugger at the selected line. From the Debug window, you can choose the usual options: resume, step in, step over, step out. In the example above there is not much to debug, but you can choose 'step in' to trace through the Scriptaculous function for SlideDown or SlideUp.

Since Aptana is based on Eclipse, it is easily extended, and it also has support for PHP, Ruby on Rails, Python and Adobe Flex. You can use it with the Flex SDK to create Flash and Air applications, as an alternative to Adobe's official Flexbuilder IDE. It also includes the Jaxer server, which runs Javascript server-side, and an option to deploy your applications on Aptana's cloud platform, which is provided by Joyent. It packs in a lot of features, but still falls short of the ease of use in Microsoft's Visual Studio. **PCW**

Resources

Firebug: <http://getfirebug.com>
Visual Web Developer Express: www.microsoft.com/express/vwd
Aptana: www.apptana.com
Scriptaculous: <http://script.aculo.us>



SCREEN 5

Setting options for tag formatting in Visual Studio

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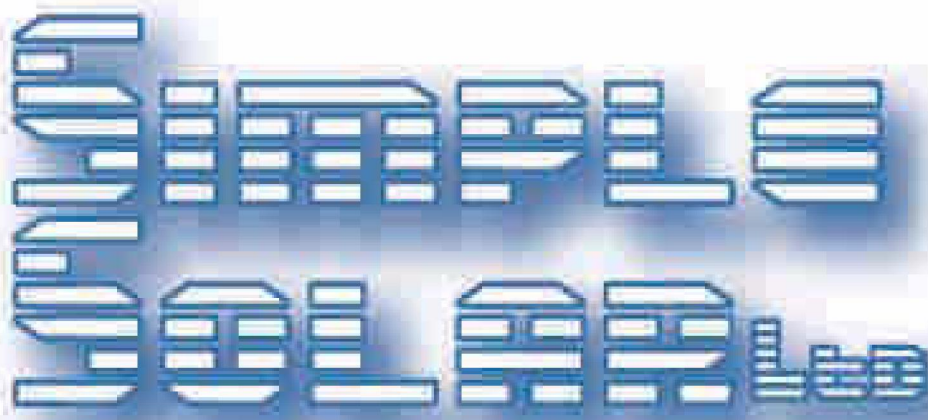


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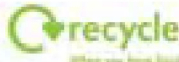
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16:9 TFT monitors

With Blu-ray drives and HD decoding, modern PCs are great for watching movies, so why not pair them with a widescreen 'full HD' monitor? The latest models have the same aspect ratio as a television, so are they just the job for a media PC? Find out next month.



Surveillance state

In 1970, computer pioneer AS Douglas said "a tyranny is only tolerable because of its inefficiency". More recently, the House of Lords said that "There can be no justification for this gradual but incessant creep towards every detail about us being recorded and pored over by the state." But what's all the fuss about? Find out in our special investigation into personal privacy.

Multi-boot PCs

With more people wanting to try out operating systems such as Windows 7 beta or Linux, the subject of multi-booting several operating systems is hot. It's not difficult to set up a multi-boot PC, but there are some tricky 'gotchas'. Read our expert guide to find out all you need to know.



**There's lots more in June's PCW
DON'T MISS IT...**

MAY 2004

From the archives: Take a look at the important events in technology five, 15 and 25 years ago.

Nvidia's rivalry with ATI was in full swing, prompting the problem of when to buy a rapidly changing technology. In our group test of 3D graphics cards, we pointed out that prices would plummet with the release of the next chipsets. Of course on that basis no-one would have bought any computer parts for the past 20 years.

Claims that PCs would be ousted by thin clients, acting as a front end to applications running on remote servers, were the subject of much discussion in the late 1990s. The argument has recently taken an odd twist with vendors making an artificial distinction between laptops and netbooks, as if the latter are little more than thin clients.



Hard-disk storage costs had dropped to around £1.50 per gigabyte. Just a decade previously people had been delighted to buy a 100MB Zip cartridge for around £12. That's a decrease of well over a thousandfold; as important was the fact that capacities were now measured in gigabytes rather than megabytes.

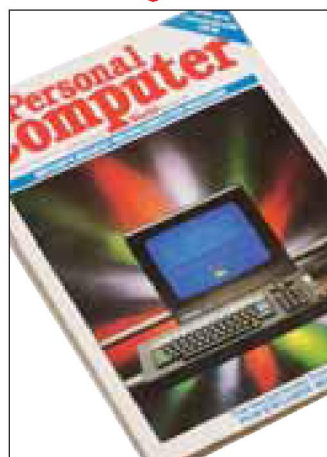
In the news section we reported that Intel had quietly let slip the fact that it was to offer a 64-bit chip. AMD had upstaged it at Computex earlier in the year by announcing the 64-bit Opteron. The move from 32-bit made little difference to home users, though it is becoming more important with the prospect of massive memory capacities requiring 64-bit addressing.

MAY 1984

Alan Sugar's Amstrad, best known in 1984 for audio products, made its computing debut with the CPC4 64, described by Guy Kewney as "better than Sinclair's Spectrum, cheaper than the BBC Micro". Sugar's great, if short-lived, contribution to UK computing was to apply consumer electronics know-how to producing good machines people could afford.

Guy, commenting on a report that Japan planned to spend up to \$125bn on fibre and satellite links, remarked elsewhere in PCW: "Are we ever going to spend the early 2000s (next century, twit) cursing the politicians who have cabled Britain with wire?"

Dick Pountain put the Sharp PC5000, one of the first portable computers, through its paces. It had an 80x8 character text display, 128KB of Ram, and weighed 4.3kg. This weight may have had something to do with the fact that it had a small lead-acid battery. The good news was that it lasted six hours; the bad news was that it took two days to charge fully.



MAY 1994

Powermacs marked Apple's move from the Motorola 68000 processor to the Power PC Reduced Instruction Set Computing (Risc) family that would power Macs until the company adopted Intel architecture in 2006.

The Power PC stemmed from an alliance between IBM, Motorola and Apple who tried over the next half-decade to push it as an Intel alternative. The Windows NT 3.51, Solaris, AIX Unix and OS/2 operating systems were ported to it and were regularly

benchmarked as faster than on Intel platforms. But the Power PC never came close to threatening Intel dominance.

Our cover described it as Apple's Pentium killer but at this stage the Pentium was not hard to beat. The first Pentiums were slow and the 90MHz one used in the Viglen also reviewed this issue was one of the first to justify an upgrade from the 486.

We also looked at fractal compression, another technology that never lived up to its promise though the theory behind it was fascinating.



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